INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

LIND TUG AND BARGE, INC.
OYSTER SHELL MINING PROJECT

November 2018

CEQA Lead Agency:
California State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825

Applicant:
Lind Tug and Barge, Inc.
100 East D Street
Petaluma, CA 94952

MISSION STATEMENT

The California State Lands Commission provides the people of California with effective stewardship of the lands, waterways, and resources entrusted to its care through preservation, restoration, enhancement, responsible economic development, and the promotion of public access.

CEQA DOCUMENT WEBSITE

www.slc.ca.gov/Info/CEQA.html

Geographic Location (Lease PRC 5534.1)

Latitude: 37.61387
Longitude: -122.22065
WGS 84 Datum

Cover Photo: William Butler
(Photo courtesy of Lind Tug and Barge, Inc.)

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LIST OF ABBREVIATIONS AND ACRONYMS

	µ	micron
	µg/m^3	micrograms per cubic meter
A	AAM	Annual Arithmetic Mean
	AB	Assembly Bill
	APCD	Air Pollution Control District
	APM	Applicant Proposed Measure
	AR5	Fifth Assessment Report
B	BAAQMD	Bay Area Air Quality Management District
	BCDC	Bay Conservation and Development Commission
C	CAAQS	California Air Quality Standards
	Caltrans	California Department of Transportation
	CANTVCP	California Non-Tank Vessel Contingency Plan
	CAP	Clean Air Plan
	CARB	California Air Resources Board
	CDFG	California Department of Fish and Game
	CDFW	California Department of Fish and Wildlife
	CEQ	U.S. Council of Environmental Quality
	CEQA	California Environmental Quality Act
	CESA	California Endangered Species Act
	CFR	Code of Federal Regulations
	CHRIS	California Historical Resources Information System
	CNEL	Community Noise Equivalent Level
	CO	carbon monoxide
	CO_2	carbon dioxide
	CO_2e	carbon dioxide equivalent
	CSLC	California State Lands Commission
	CWA	Clean Water Act
	cy	cubic yard
D	dB	decibel
	dBA	A-weighted decibels
	DEPM	Division of Environmental Planning and Management
	DPM	Diesel Particulate Matter
E	EFH	Essential Fish Habitat
	EIR	Environmental Impact Report
F	FESA	Federal Endangered Species Act
	FHWG	Fisheries Hydroacoustic Working Group
G	GHG	Greenhouse Gas
	gpm	gallons per minute
	GPS	global positioning system
	GWP	global warming potential

H	H_2S	hydrogen sulfide
	hp	horsepower
	Hz	hertz
I	IPCC	Intergovernmental Panel on Climate Change
K	knot	nautical mile per hour
L	L_{dn}	day-night average sound level
	LMI	Lind Marine Incorporated
	LTB	Lind Tug and Barge, Inc.
M	MISP	Marine Invasive Species Program
	MLLW	Mean Lower Low Water
	MM	Mitigation Measure
	MMP	Mitigation Monitoring Program
	MMT	Million metric tons
	$MMTCO_2e$	Million metric tons of carbon dioxide equivalent
	MND	Mitigated Negative Declaration
	MT	metric tons
N	N_2O	nitrous oxide
	NAAQS	National Ambient Air Quality Standards
	NAHC	Native American Heritage Commission
	NAS	Non-Native Aquatic Species
	NMFS	National Marine Fisheries Service
	NO_X	nitric oxides
	NO_2	nitrogen dioxide
	NOAA	National Oceanic and Atmospheric Administration
	NWIC	Northwest Information Center, Sonoma State University
O	O_3	ozone
	OEHHA	Office of Environmental Health Hazard Assessment
	OSHA	Occupational and Health Safety Administration
	OSPR	Office of Spill Prevention and Response
P	PL	Public Law
	PM	particulate matter
	PM_{10}	particulate matter less than 10 micrometers
	$PM_{2.5}$	particulate matter less than 2.5 micrometers
	ppb	parts per billion
	ppm	parts per million
R	ROC	reactive organic compound
	ROG	reactive organic gases
S	SB	Senate Bill
	SEL	sound exposure level
	SFBAAB	San Francisco Bay Area Air Basin
	SFBRWQCB	San Francisco Bay Regional Water Quality Control Board

	SIP	State Implementation Plan
	SMARA	Surface Mining and Reclamation Act
	SO_2	sulfur dioxide
	SPL	sound pressure level
T	TAC	toxic air contaminant
U	U.S.	United States
	USCG	U.S. Coast Guard
	USEPA	U.S. Environmental Protection Agency
	USGS	U.S. Geological Survey
V	VRP	Visibility Reducing Particles

The California State Lands Commission (Commission or CSLC) conducted this Initial Study, as lead agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.), to analyze and disclose the potential environmental effects of the proposed Lind Tug and Barge, Inc. (LTB or Applicant) Oyster Shell Mining Project (Project). The CSLC prepared a Mitigated Negative Declaration (MND) because it determined that, while the Initial Study identified potentially significant effects, measures are incorporated into the Project proposal and agreed to by the Applicant to avoid or mitigate the effects to a point where clearly no significant effect on the environment would occur.

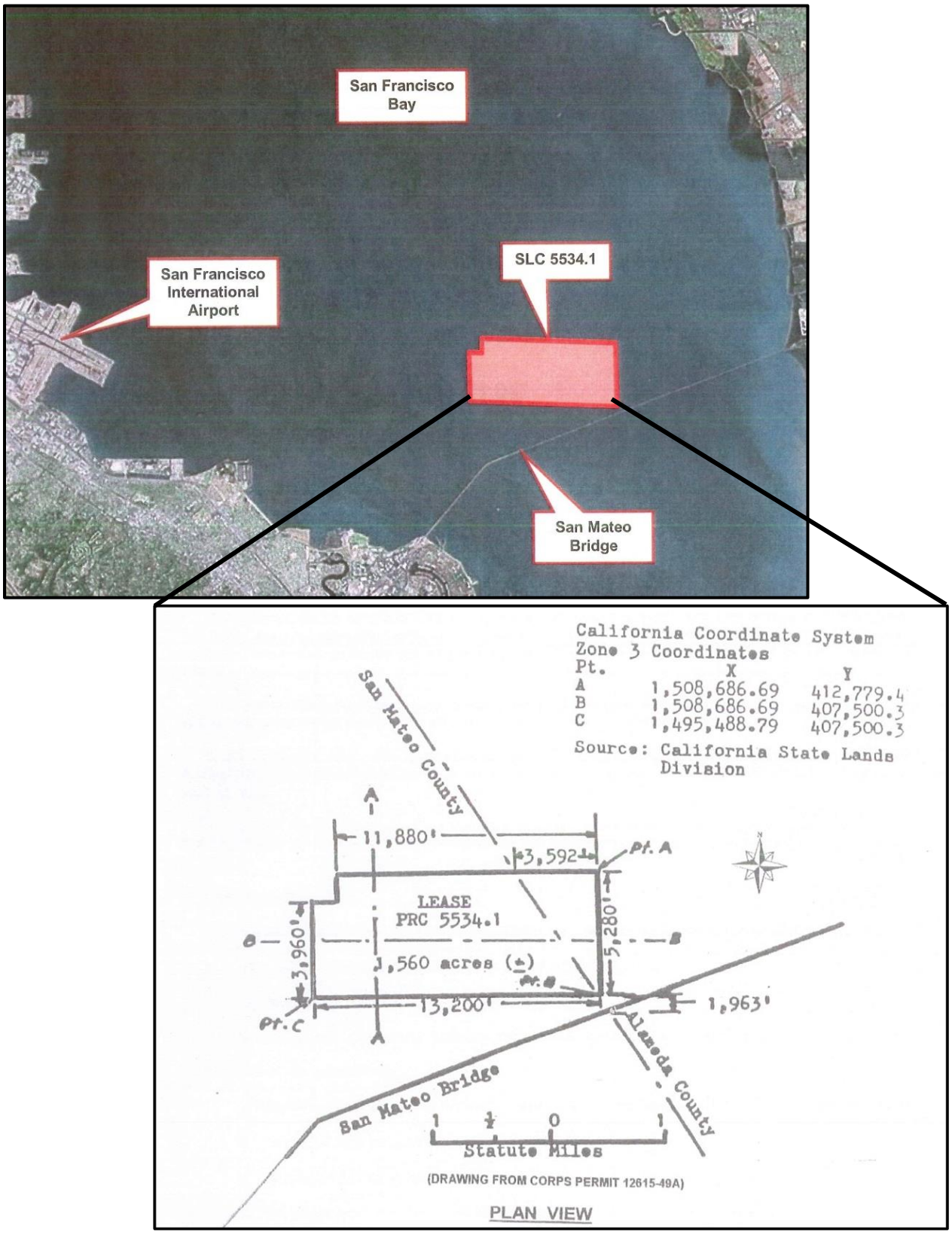
PROPOSED PROJECT

LTB, formerly Morris Tug and Barge, commercially mines historic oyster shell deposits, pursuant to CSLC Lease No. PRC 5534.1, in the South San Francisco Bay (South Bay) adjacent to the San Mateo Bridge in San Mateo and Alameda counties (Figure ES-1). The approximately 1,560-acre lease area is in shallow (15-foot water depth or less) open-water subtidal areas of the South Bay. In 1978, the Commission awarded a Mineral Extraction Lease (PRC 5534.1) to Morris Tug and Barge (Item 42, November 27, 1978). The lease was renewed in 1989, for 10 years with a right to renew for two successive periods of 5 years each (Item 32, August 30, 1989). In 2006, the Commission adopted a Negative Declaration (CSLC 2005) and approved a new lease (Item C34, December 14, 2006). That lease expired on December 31, 2016, and is currently in month-to-month holdover status. LTB has applied for a new lease to continue to mine historic oyster shell deposits within the existing lease area for a 10-year period ending in 2028.

Oyster shell was mined from the South Bay as early as 1891, for use in garden walks and other purposes, and has been commercially mined from the South Bay since 1924 (Hart 1978). From the mid-1920s through the 1980s, the largest quantities of oyster shell were mined from the South Bay (by companies that no longer mine oyster shell locally) for use as a raw material to manufacture cement. LTB has mined oyster shell from the South Bay for about 40 years, and its parent company has operated for more than 90 years, mining oyster shells and processing them at company facilities in Petaluma and Collinsville. More recently, the oyster shell has been processed and used as a high-grade mineral and nutrient supplement in poultry diets, a soil amendment, pharmaceuticals, and as an amendment to neutralize livestock waste.

The type of mining methods and mining location have remained relatively the same for decades and are proposed to remain the same for future operations. The CSLC lease and regulatory permits currently limit LTB to annual mined volumes of 80,000 cubic yards (cy).

Figure ES-1. Oyster Shell Mining Vicinity Map with Detailed Lease Area



As part of its current oyster shell mining operations, the Applicant employs measures to avoid or minimize potential adverse effects. As part of its proposed Project description evaluated in this Initial Study/MND, the Applicant proposes to implement the Applicant Proposed Measures (APMs) listed in Table ES-1.

Table ES-1. List of Applicant Proposed Measures (APMs)

Air Quality and Greenhouse Gas Emissions	**APM-1: Replacement of Tier-0 and Tier-1 Pump Engines with Electric Motors.** The Applicant will electrify the oyster mining and wash water pumps to eliminate the use of older less efficient diesel engines to drive the various pumps used for oyster shell mining. The change from diesel powered pumps to electrical motor driven pumps will greatly reduce impacts to air quality.
	APM-2: Electrification of the Mining Pumps with a Tier-4 Diesel Generator. [1] The Applicant will use one, state-of-the-art Tier-4 diesel generator to power all barge mining equipment to further contribute to a substantial reduction in air emissions when compared to the environmental baseline. The change to the Tier 4 diesel generator has been proposed and implemented by the Applicant.
Biological Resources	**APM-3: Periodic Bathymetric Surveys.** The Applicant will conduct bathymetric surveys to assess current and future bathymetric conditions within the lease area. The Applicant proposes to conduct further periodic bathymetric surveys beginning in 2018, then 2022 and 2026 to evaluate potential trends and impacts with regard to South Bay bathymetry. The Applicant will collaborate with regulatory agencies to develop the survey parameters.
	APM-4: Seasonal Curtailment of Mining. A 2-month seasonal curtailment of mining (no mining activities) will occur between February and June of the calendar year. Prior to January 31 of each year, the Applicant shall request California Department of Fish and Wildlife to determine the appropriate 2-month window to ensure the curtailment is consistent with seasonal avoidance windows in other regions of the San Francisco Bay to avoid take of state listed species.
Hydrology and Water Quality	**APM-5: Water Quality Wash Water Plume Study within First 2 Years of New Permits**. The Applicant will collaborate with the San Francisco Bay Regional Water Quality Control Board and other interested agencies to design, fund, conduct, and report results of a discharge plume water quality monitoring study as part of the Project within 2 years after execution of a new lease.
Recreation and Transportation/ Traffic	**APM-6**: **Local Notice to Mariners**. Before and after all transit activities with the oyster shell mining tug, dredge barge and hopper barge, LTB shall contact and notify USCG, District 11 San Francisco Bay Vessel Traffic Control of all transit activities inbound and outbound to and from the lease mining area in South Bay and transiting to Mare Island or the offloading facilities.

Note: [1] Tier 4 refers to the most recent emission milestone established by the U.S. Environmental Protection Agency and California Air Resources Board applicable to new engines found in off-road equipment including marine vessels and workboats.

As discussed in Section 3, *Environmental Checklist and Analysis*, of this MND, the APMs provide increased protection for air quality, biological resources, and recreation/marine transportation among other environmental issue areas within the South Bay. For example, the APMs for air quality include accelerated equipment upgrades to Tier 4 levels several years before required change-out dates, while the APMs for biological resources provide increased protection within the South Bay for listed salmonids and smelt and their critical habitats.

ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MEASURES

The environmental factors checked below in Table ES-2 would be potentially affected by the proposed Project (continued oyster shell mining activities); a checked box indicates that at least one impact would be a "Potentially Significant Impact" but the Applicant has agreed to Project revisions, including the implementation of mitigation measures (MMs), that reduce the impact to "Less than Significant with Mitigation," as detailed in Section 3 of this MND. Table ES-3 lists proposed MMs designed to reduce or avoid potentially significant impacts. With implementation of the proposed MMs, all Project-related impacts would be reduced to less than significant.

Table ES-2. Environmental Issues and Potentially Significant Impacts

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural and Paleontological Resources	☒ Cultural Resources – Tribal
☐ Geology and Soils	☐ Greenhouse Gas Emissions	☒ Hazards and Hazardous Materials
☐ Hydrology and Water Quality	☐ Land Use and Planning	☐ Mineral Resources
☐ Noise	☐ Population and Housing	☐ Public Services
☐ Recreation	☐ Transportation/Traffic	☐ Utilities and Service Systems
☒ Mandatory Findings of Significance		

Table ES-3. Summary of Proposed Project Mitigation Measures

Biological Resources	**MM BIO-1**: Turbidity Reduction during Mining
	MM BIO-2: Limited Volume per Year
	MM BIO-3: Installation of Positive Fish Barrier Screens
	MM BIO-4: Limited Water Pumping Depths
	MM BIO-5: Mitigation Effectiveness Monitoring
	MM BIO-6: Limited Mining Area
Cultural and Paleontological Resources and Cultural Resources – Tribal	**MM CUL-1**: Annual Crew Worker Cultural Sensitivity Training **MM CUL-2:** Unanticipated Discovery of Human Remains
Hazards and Hazardous Materials	**MM HAZ-1**: Hazardous Material Control and Spill Prevention and Response Plan

1.0 PROJECT AND AGENCY INFORMATION

1.1 PROJECT TITLE

Lind Tug and Barge, Inc. Oyster Shell Mining Project (Project)

1.2 LEAD AGENCY AND PROJECT SPONSOR

CEQA Lead Agency	Contact Person
California State Lands Commission 100 Howe Avenue, Suite 100-South Sacramento, CA 95825	Christopher Huitt, Senior Environmental Scientist Environmental Planning and Management Division Christopher.Huitt@slc.ca.gov (916) 574-2080
Applicant	**Contact Person**
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1.3 PROJECT LOCATION

Lind Tug and Barge, Inc. (LTB), formerly Morris Tug and Barge, commercially mines historic oyster shell deposits from shallow (15-foot water depth or less) open-water subtidal areas in South San Francisco Bay (South Bay). Currently, oyster shell mining occurs only within the 1,560-acre California State Lands Commission (Commission or CSLC) designated area of Lease No. PRC 5534.1, located adjacent to the San Mateo Bridge, San Mateo and Alameda counties (Figure 1-1).

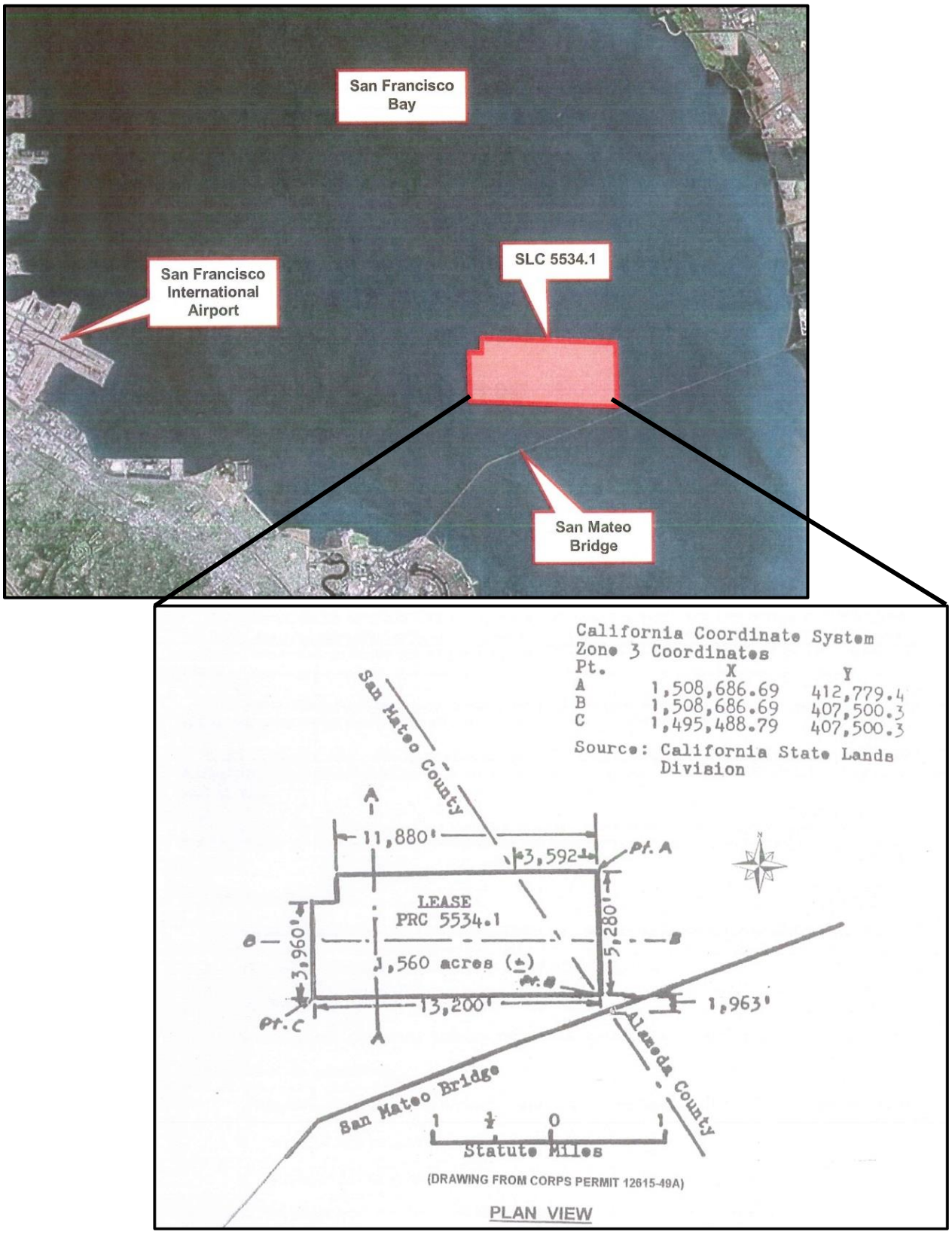
1.4 ORGANIZATION OF MITIGATED NEGATIVE DECLARATION

This Initial Study/Mitigated Negative Declaration (MND), prepared pursuant to State CEQA Guidelines section 15063, is intended to provide the CSLC, as lead agency under the California Environmental Quality Act (CEQA), and other responsible agencies with the information required to exercise their discretionary responsibilities for the proposed Project.[1] The MND is organized as follows.

- **Section 1** provides lead agency and Applicant information, Project background and objectives, a summary of the public review process, and anticipated agency authorizations.
- **Section 2** describes the proposed Project including its layout, equipment, and facilities, and provides an overview of the Project's operations and schedule.

[1] CEQA is found in Public Resources Code section 21000 et seq. The State CEQA Guidelines are found in California Code of Regulations, title 14, section 15000 et seq.

Figure 1-1. Oyster Shell Mining Vicinity Map with Detailed Lease Area



- **Section 3** provides the Initial Study, including environmental setting, identification and analysis of potential impacts, and a discussion of Project changes and other measures that, if incorporated into the Project, would mitigate or avoid those impacts, such that no significant effect on the environment would occur.
- **Section 4** presents the Mitigation Monitoring Program (MMP).
- **Section 5** discusses CSLC considerations relevant to the Project that are in addition to CEQA review, such as climate change and sea-level rise, commercial fishing, environmental justice, and the Significant Lands Inventory.
- **Section 6** presents information on report preparation and references.
- **Appendices.** The appendices include specifications, technical data, and other information supporting the analysis presented in this MND:
    - Appendix A: Abridged List of Major Federal and State Laws, Regulations, and Policies Potentially Applicable to the Project
    - Appendix B: Spill Response Field Guide Emergency Procedures Response Action Checklist
    - Appendix C: 2007 and 2014 Lind Marine Oyster Shell Lease Area 5534.1 Bathymetry Surveys
    - Appendix D: California Department of Conservation State Mining and Geology Board Surface Mining and Reclamation Act (SMARA) Notice of Completion of Inspection (CA Mine ID# 91-38-0011)
    - Appendix E: Air Quality and Greenhouse Gas Calculations

1.5 PROJECT BACKGROUND, OBJECTIVES, AND SCOPE

San Francisco Bay is the only historic deposit of oyster shell mined commercially in California. Historic oyster shell deposits originated within the South Bay in the Late Quaternary (Holocene) period, approximately 2,300 to 2,500 years ago, when the native oyster (*Ostrea lurida*) population flourished. Oyster shell, which is not much larger than a human fingernail (see Figure 1-2), was mined from the South Bay as early as 1891, for use in garden walks and other purposes, and has been commercially mined from the South Bay since 1924 (Hart 1978). In the late 1800s and early 1900s, pollution virtually eliminated oysters from the South Bay (Skinner 1962). From the mid-1920s through the 1980s, the largest quantities of oyster shell were mined for use as a raw material to manufacture cement.

Figure 1-2. Oyster Shells

The historic oyster shell deposits occur primarily in the upper 30 feet of young South Bay mud deposits and are typically overlaid and intermixed with deposits of fine sediment. The fine-grained mud substrate and high ambient turbidity and suspended sediment concentrations that occur in the South Bay and lease area contribute to unsuitable habitat conditions for oysters within the area of the relic historic oyster shell deposits, and therefore make reestablishing oysters in the area where mining occurs under current environmental conditions unlikely.

LTB has mined oyster shell from the South Bay for about 40 years, and its parent company has operated for more than 90 years. Investigations by LTB of commercial oyster producers in the Pacific Northwest and elsewhere indicate that the quantities and quality of oyster shells available from alternative sources are not adequate to meet the existing or projected future market demand in California and throughout the United States, nor can they meet the unique physical and chemical characteristics of the relic oyster shell deposits from the South Bay that make oyster shell mining a commercially beneficial activity in San Francisco Bay.

The type of mining methods and mining location have remained relatively the same for decades and are proposed to remain the same for future operations. In 1978, the Commission awarded a Mineral Extraction Lease (PRC 5534) to Morris Tug and Barge (Item 42, November 27, 1978). The lease was renewed in 1989, for 10 years with a right to renew for two successive periods of 5 years each (Item 32, August 30, 1989). In 2006, the Commission adopted a Negative Declaration (CSLC 2005) and approved a new lease (Item C34, December 14, 2006). That lease expired on December 31, 2016, and is currently in month-to-month holdover status. LTB has applied for a new lease to continue to mine historic oyster shell deposits within the existing lease area for a 10-year period ending in 2028. The proposed lease and regulatory permits currently limit LTB to annual mined volumes of 80,000 cubic yards (cy).

Oyster shell is currently processed and used as a high-grade mineral and nutrient supplement in poultry diets, a soil amendment, pharmaceuticals, and as an amendment to neutralize livestock waste (Kuhl et al. 1977). Mined oyster shell is transported by tug and barge to, and offloaded and processed at, upland industrial facilities in Petaluma (along the Petaluma River) or Collinsville (along Montezuma Slough upstream of Suisun Bay) in Solano County. These facilities are located in areas zoned and permitted for this commercial activity. In 2015, the Commission authorized a 20-year General Lease – Industrial Use (PRC 6695.1) beginning April 1, 2016, to an affiliated company, Lind Marine Incorporated (LMI), formerly Jerico Products, Inc., for the continued use and maintenance of an existing dock and dolphin pilings used for the mooring of vessels for the offloading of fossilized oyster shells on sovereign land in the Petaluma River, near the city of Petaluma (Item C25, October 15, 2015). The Collinsville processing facility is not located on sovereign land under the CSLC's jurisdiction. This facility is under the jurisdiction of the San Francisco Bay Conservation and Development Commission

(BCDC) in which a permit has been issued to Levine-Fricke Recon/Montezuma Wetlands LLC (Permit No. 1998.014.05md). Since these are existing and separately permitted facilities, operations at these facilities are not analyzed in this MND.

1.6 PUBLIC REVIEW AND COMMENT

Pursuant to State CEQA Guidelines sections 15072 and 15073, a lead agency must issue a proposed MND for a minimum 30-day public review period, during which agencies and the public have an opportunity to review and comment on the document. Responses to written comments received by the CSLC during the 30-day public review period will be incorporated into the MND. In accordance with State CEQA Guidelines section 15074, subdivision (b), the CSLC will review and consider the MND, together with any comments received during the public review process, prior to taking action on the MND and Project at a noticed public hearing.

1.7 APPROVALS AND REGULATORY REQUIREMENTS

All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the common law Public Trust. The State acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space.

On tidal waterways, the State's sovereign fee ownership extends landward to the mean high tide line, except for areas of fill or artificial accretion. The CSLC's authority is set forth in Division 6 of the Public Resources Code and California Code of Regulations, title 2, sections 1900–2970. The CSLC has authority to issue leases or permits for the use of sovereign land held in the Public Trust, including all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways, as well as certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6009, subd. (c); 6009.1; 6301, 6306). The CSLC must comply with CEQA when it undertakes an activity defined by CEQA as a "project" that must receive discretionary approval (i.e., the CSLC has the authority to approve or deny the requested lease, permit, or other approval) which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment. CEQA requires the CSLC to identify the significant environmental impacts of its actions and to avoid or mitigate those impacts, if feasible.

Oyster shell mining within San Francisco Bay is regulated by several State and federal agencies that issue permits or approvals identifying specific areas where mining may occur and specifying the volume of oyster shell that may be mined each year in those

areas (see Table 1-1). In developing these permits, several resources agencies evaluate the potential for oyster shell mining to result in adverse impacts to the following:

- Fish species listed for protection under the California or federal Endangered Species Acts (listed species)
- Species of special concern
- Regions of the estuary designated as critical habitat for listed species
- Essential Fish Habitat (EFH) for managed species which support commercial or recreational fishing as identified through resource management plans adopted by the Pacific Fisheries Management Council and managed under the authority of National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS)

Other agencies address air and water quality, marine transportation, and other potential impacts to the environment that may be affected by the proposed Project.

Table 1-1. Anticipated Approvals/Regulatory Requirements

Agency		Permit/Authorization
State	California State Lands Commission	Lease No. PRC 5534.1 for the use of sovereign land
	Bay Conservation and Development Commission	Coastal Development Permit pursuant to McAteer-Petris Act (Gov. Code, § 66600 et seq.) for activity that extracts materials from San Francisco Bay
	San Francisco Bay Regional Water Quality Control Board	Water Quality Certification pursuant to Clean Water Act (CWA) Section 401
	California Department of Fish and Wildlife	California Endangered Species Act – Section 2081, Incidental Take Permit
	California Department of Conservation	Surface Mining and Reclamation Act permit
Federal	National Marine Fisheries Service	Federal Endangered Species Act (FESA) Section 7 consultation, if required; consultation on marine species protection; Essential Fish Habitat
	U.S. Army Corps of Engineers	CWA Section 404 and Section 10 Permit (under Nationwide Permit No. 12)
	U.S. Coast Guard	Local Notice to Mariners
	U.S. Fish and Wildlife Service	FESA Section 7 consultation, if required; protection of regions designated as critical habitat for species listed under the FESA

2.0 PROJECT DESCRIPTION

2.1 PROJECT WORK AREAS AND OVERVIEW

Lind Tug and Barge, Inc. (LTB), formerly Morris Tug and Barge, commercially mines historic oyster shell deposits from shallow (15-foot water depth or less) open-water subtidal areas located within South San Francisco Bay (South Bay). Currently, oyster shell mining occurs only within the approximately 1,560-acre California State Lands Commission (Commission or CSLC) designated area of Lease No. PRC 5534.1, adjacent to the San Mateo Bridge, San Mateo and Alameda counties (see Figure 1-1 above).

2.2 ENVIRONMENTAL SETTING

Mining activities in the South Bay typically occur in deeper water portions of the lease area located mainly along the western border of the lease where water depths at Mean Lower Low Water (MLLW) typically range from 8 to 13 feet. The shallow portions of this offshore work environment are typically characterized by higher waves and localized wind fetch (the distance wind travels over water before meeting an obstacle, such as a vessel), which can create difficult conditions to effectively mine oyster shell. The waves and impacts from wind fetch are reduced in deeper water.

2.3 OYSTER SHELL MINING METHODS AND EQUIPMENT

Vessels used to mine oyster shell deposits include a tugboat, a hydraulic suction dredge, and a hopper barge. The current dredge, which was placed into service at the end of 2013 and is custom-designed to mine oyster shells from the South Bay, is powered by new, energy-efficient diesel and electric engines (see Table 2-1). The dredge mines the oyster shell using the "trailing suction trolling" method and then washes and places the shell into the hopper barge (see Figures 2-1 through 2-3). As noted below, the barge *South Bay* (the mining barge during baseline conditions) was recently replaced by two new barges.

Table 2-1. Summary of Shell Mining Equipment Engines

Engine	Manufacturer, Model, Model Year, horsepower (hp)	Tier
2013 Engine Configuration (Baseline)		
Main Tug Engines (2)	Cummins 6CTA8.3M (2002) – 255 hp diesel	**1**
Generator	Kubota V3300-T (2001) – 80 hp diesel	**1**
Dredge Pumps (2)	Detroit 671 (1972) – 100 hp diesel	**0**
Wash Pumps (2)	Detroit 671 (1972) – 100 hp diesel	**0**
	Detroit 471 (1978) – 80 hp diesel	**0**
2018 Engine Configuration (Current or Proposed)		
Main Tug Engines (2)	Cummins QSK 10-M (2013) – 660 hp diesel	**3**
Generators (2)	John Deere 4045DFM70 (2011) – 67 hp diesel	**3**
	John Deere: Tier-4 New (2017) – 550 hp diesel	**4**
Dredge and Wash Pumps	Electric	**N/A**

Figure 2-1. Current Oyster Shell Tug/Dredge Configuration

Figure 2-2. Schematic diagram of "trailing suction trolling" method

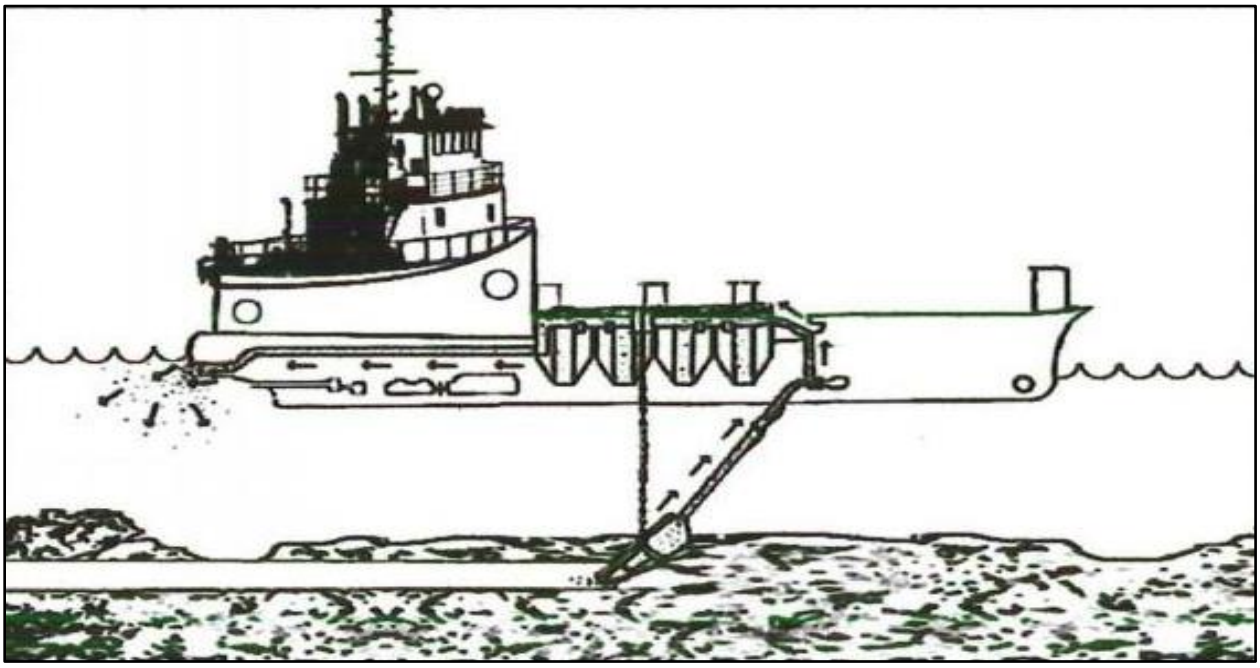
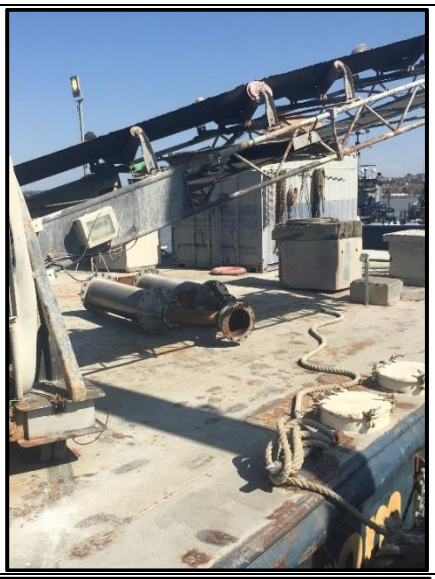


Figure 2-3. Equipment Used in Oyster Shell Mining

[A]
Current Dredge Suction Pipe, Drag Head (Left)

and

Washed Oyster Shell Conveyor (Right)



[B]
Rotating Trommel Screen for Washing and Screening Oyster Shell

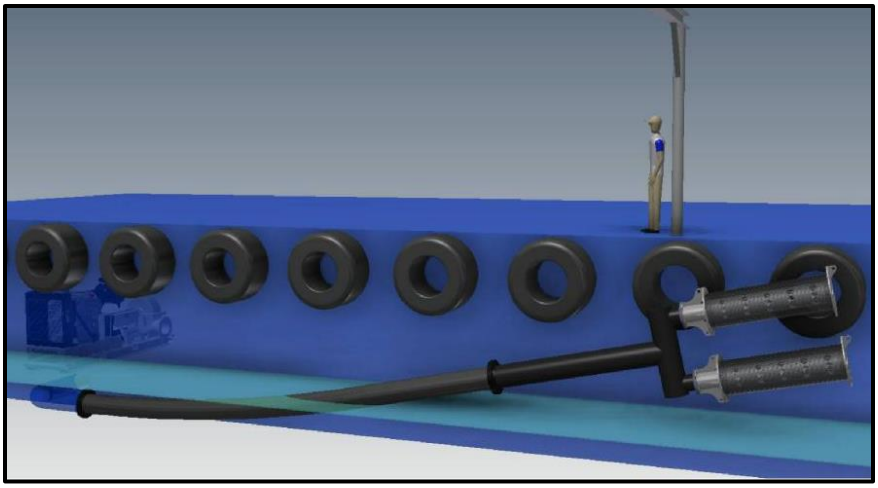
[C]
Fish Screen Mounted on Suction Pipe

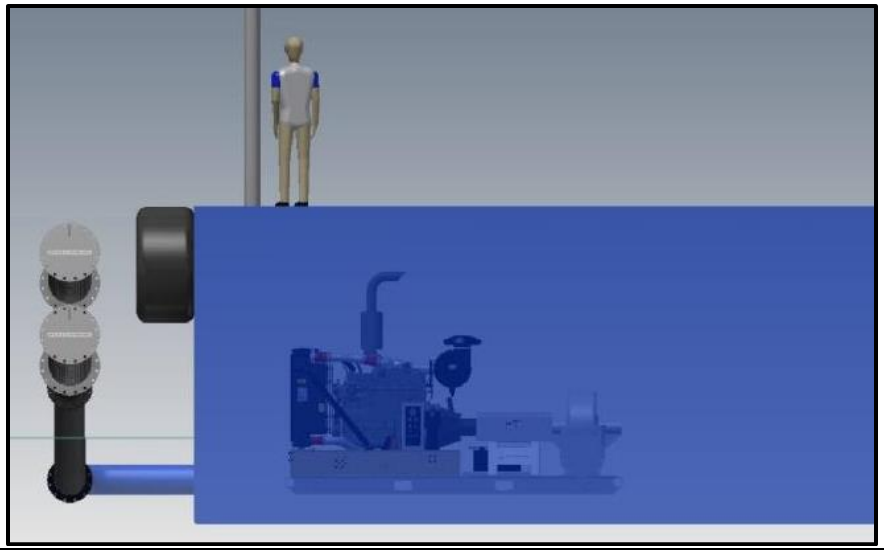
Figure 2-3. Equipment Used in Oyster Shell Mining

[D]
Dual Fish Screen Assembly Used for Rinse Water

[E]
Conceptual Fish Screen Design with Diesel Engine, Electric Motor, Centrifugal Pump, and Rinse Water Intake Hose

(Side and Front Views)





2.3.1 Mining Methods

A tugboat pushes the shell dredge and hopper barge to the lease area and propels the barge as mining occurs at a speed between 1 and 2 nautical miles per hour (knots). Shell deposits are mined from below the substrate surface by slowly trolling over the deposits within the lease area.

A 12-inch-diameter suction pipe equipped with a 24-inch by 32-inch drag head (Figure 2-3 [A left]) is lowered into the shell substrate and the bay mud for mining, typically within approximately 2 to 3 feet below the substrate surface to reduce take of listed species. The suction pipe is mounted on the side of the barge and raised and lowered by an electric winch powered by the main barge electric motor. A shell pump then transports shells, water, and silt slurry from the bay floor up into the raised rear or back of a large rotating trommel screen where the shells are washed and screened (Figure 2-3 [B]). The current shell dredge uses a single pump that pumps approximately 6,000 gallons per minute (gpm) of slurry; in October 2016, this pump was permanently placed internally in the barge and powered by an electric motor that will be operated by a Tier 4 diesel engine.

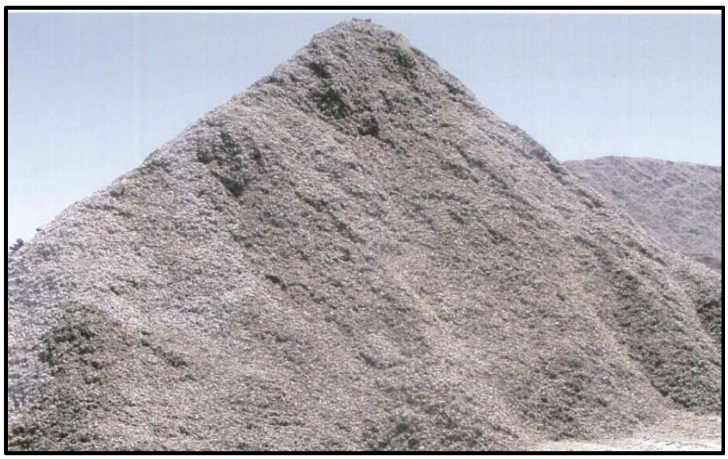
The slurry contains approximately 50 percent shell, 45 percent water, and 5 percent silt; the ratios vary depending on characteristics of the localized shell-sediment deposits. Most of the water used to make the slurry is drawn through interstices (spaces) between the shell substrate; however, a small 4-inch-diameter line on the top of the drag head enables water from above the substrate to enter the drag head to facilitate slurry formation when the shell material is more consolidated. To protect against entraining any fish (adult or juvenile) or other organisms into the drag head through this line, a single stationary positive barrier cylindrical fish screen is mounted on the suction pipe, as detailed below.

In the trommel screen, additional screened water is added through spray bars. This water is supplied from a wash pump (12-inch-diameter pumping approximately 3,700 gpm) and an intake hose that is lowered into the water alongside the barge and is raised at the end of the mining activity. As the trommel rotates, silt is washed from the shells, and the water and silt are discharged to the South Bay through a pipe extending through the bottom of the shell dredge (about 4.5 feet underwater). The tug boats used for the mining operation have a draft of 6 feet and the new hopper barges have an empty draft of 1.5 feet and a full draft of 8 feet. The shell dredge has a draft of 4.5 feet.

The washed shells are conveyed to a hopper barge from the trommel using a 24-inch conveyor belt (Figure 2-3 [A, right]). The hopper barge is kept level (trim) by moving the conveyor from side to side to distribute the washed shells evenly in the barge as well as by repositioning the barge next to the shell dredge as needed. Once the hopper barge is loaded, the tugboat pushes the loaded hopper barge and shell dredge to Mare Island in Vallejo, where the shell dredge is moored between mining events or episodes, or Pier 54 in San Francisco. The oyster shell is sold by the barge load exclusively to an affiliated

company, Lind Marine Incorporated (LMI), formerly Jerico Products, Inc. The loaded hopper barge is transported by tug to one of LMI's two existing and permitted upland shell processing facilities: Petaluma, along the Petaluma River; and Collinsville, along Montezuma Slough upstream of Suisun Bay. At the offload site, a hydraulic excavator stationed scoops shell from the barge into a conveyor hopper feeding onshore conveyors, which stockpile the shell for further processing at the processing facility (Figure 2-4). The shell is then distributed to accommodate market demand in California and the western U.S.

Figure 2-4. Typical Oyster Shell Stockpile



Approximately 600 tons; 20 feet x 40 feet x 150 feet.

Since October 2016, the Applicant has operated using a new dredge configuration with various barges used to transport washed oyster shell to either the Petaluma or the Collinsville processing facility. The barge *South Bay* (the mining barge during baseline conditions) has been replaced by two new barges, which have a larger storage capacity (ranging from 900 tons [1,800 cy] to 2,400 tons [4,800 cy]; see Section 2.4, below) and greater mining efficiency that reduce the frequency and duration of mining events and, correspondingly, mining-related air emissions, compared to the *South Bay.*

2.3.2 Protective Measures

As part of its oyster shell mining operations within the South Bay, LTB implements measures to avoid or minimize potential adverse effects to biological resources and air quality. Measures related to marine biological resources include the use of positive barrier fish screens to provide increased protection for listed salmonids, smelt, and other aquatic resources within their critical habitat. Measures related to air quality include equipment upgrades to efficient and cleaner Tier-4 engines scheduled several years before required change-out dates.[2] As discussed in Section 2.5, Applicant Proposed Measures (APMs) are included as part of the Project evaluated in this Initial Study/Mitigated Negative Declaration (MND).

As noted above, the Applicant uses positive barrier fish screens on the wash water intake and suction pipe on the drag arm (Figure 2-3 [C and D]). The fish screens on both pumps, which are designed to meet delta smelt standards (e.g., 0.2 foot/second approach velocity, 1.75-millimeter screen mesh openings), allow the Applicant to pump water and

[2] Tier 4, which applies to new engines found in off-road equipment including marine vessels and workboats, is an emission milestone set by California Air Resources Board and U.S. Environmental Protection Agency.

mine oyster shells without entraining juvenile or adult special status fish species while mining. A single stationary cylindrical screen is mounted on the suction pipe and connected with a 4-inch-diameter line to the opening in the top of the drag head (Figure 2-3 [C]). This allows the make-up slurry water (water added to the oyster shell and sediment pumping) pulled from above the substrate to pass through the screen to prevent entrainment of fish. For the wash pump intake, dual cylindrical stationary screens (Figure 2-3 [D]), which also comply with the above delta smelt standards, are connected in parallel to the intake hose, so that all wash pump water passes through the screens. When the refit of the internal wash pump is complete, the intake will pass through either the bottom or side of the barge as shown in the design details in Figure 2-3 [E]; currently, the screens connect to the intake hose for the rental pump when it is on board for mining episodes. CSLC staff consulted with California Department of Fish and Wildlife (CDFW) staff regarding the fish screen design and specifications; CDFW staff believe that the screens, when attached to the rinse water intake hose, will likely meet or exceed delta smelt entrainment standards (Arenberg, personal communication, 2017).

The Applicant has installed, and plans new, refinements to its shell mining equipment as part of the Project. Historically, the mining equipment was powered by two separate and older diesel engines, one Tier-0 and one Tier-1 (baseline condition). For the proposed Project, the Applicant would electrify all pumps and equipment and operate them with a single Tier-4 on-board generator. Currently, the dredge pump and other process equipment have been converted to electric power. The wash pump, which rinses the shells when they are mined and placed into the trommel screen, is currently powered by a Tier 4 rental unit located on the barge deck to reduce the impacts to air quality of using an older diesel engine. The Applicant proposes to permanently install an electric wash pump in 2018. At that time, other than the tugboat diesel engines, all oyster shell mining equipment will be operated by electric motors powered by one Tier-4 diesel generator.

2.4 CHARACTERISTICS OF OYSTER SHELL MINING EVENTS

This section discusses general oyster shell mining events, including spatial and temporal distribution, duration, and anticipated number and intensity of mining episodes.

2.4.1 Spatial Distribution

Oyster shell mining does not occur uniformly throughout the lease area. Oyster shell mining is functionally limited, in part, by shallow water depths in portions of the lease area, which preclude significant mining activities unless timing of the event coincides with high tide. Therefore, mining activities occur more frequently in the deeper water portions along the western border of the lease, where water depths typically range from 8 to 13 feet MLLW and where wave activity is reduced, thus allowing more efficient mining.

To help assess current bathymetric conditions within the lease area and changes to bathymetric conditions, Appendix C includes the results of a single-beam bathymetry

survey of the lease area conducted on April 30 through May 1, 2014 by Bay Marine Services (2014). The survey represents depths relative to MLLW in the lease area. Appendix C also includes data from a 2005 single-beam bathymetry survey conducted under contract with the U.S. Geological Survey (USGS) (see http://pubs.usgs.gov/of/2007/1169) and plotted by eTrac Engineering LLC (2007) with the lease area overlaid in 2007. Comparison between the surveys shows that some portions of the lease area have experienced minor changes in bathymetry, with some areas showing deepening and some showing shallower depths. The western area of the lease where mining mostly occurs shows a slight increase in depth (0-2 feet); however, areas where mining does not typically occur also showed slight changes in bathymetry, so the actual potential effects of mining are not clear or conclusive based on these surveys.

To continue to develop information on bathymetric trends, LTB proposes to conduct further periodic bathymetric surveys beginning in 2018, then 2022 and 2026 to evaluate potential trends to South Bay bathymetry **(APM-3)**. LTB will collaborate with state and federal permitting agencies to develop the survey parameters. As proposed, the periodic bathymetric surveys would provide mining distribution and trend information to agencies during the lease term for future management decisions regarding the mining Project.

2.4.2 Temporal Distribution and Duration of Mining Episodes

Shell mining activity may occur at any time of day and for different durations, depending on tides, currents, winds, weather (e.g., fog), the size of the hopper barge being loaded, positioning, intermittent delays/breakdowns, and other considerations. Actual mining and pumping duration with the current dredge configuration averages approximately 80 percent of the total time of operation. Transit time between the lease area and one of the two land-based manufacturing plants (Petaluma or Collinsville) is approximately 8 hours (empty barge) to 12 hours (full barge) one way depending on the onshore facility used. It takes 6 hours to more than a day to fill the barge, and 6 to 8 hours to unload at the delivery site. Product demand for the oyster shell dictates the frequency and number of mining events that occur. Limited land-based storage of mined shell product and demand dictate the mining event frequency.

Use of new, cleaner and more efficient engines and larger-volume barges has resulted in fewer oyster shell mining events to meet demand, even though the duration of individual events has increased. For example, the estimated number of mining events required to mine 80,000 cy of oyster shell is as follows: historical barge *South Bay* operations required approximately 91 mining events over 910 hours; new mining equipment and configuration require about 28 mining events over an estimated 409 hours. The conversion of the mining equipment to efficient electrical motors powered by a Tier-4 diesel generator will directly reduce oyster shell mining air emissions. In addition, more efficient mining of larger volumes of oyster shell per mining event reduces the number of round trips between the processing facilities and the lease area, which results in lower

fuel consumption and reduced associated air emissions associated with vessel transit compared to historic operations.

Mining Volumes and Seasonal Distribution

Mining volumes and seasonal timing of mining events are largely dictated by demand for oyster shell product; since most of the product is used for agricultural feed supplement, which has a constant demand; seasonality has little influence. The CSLC lease and San Francisco Bay Conservation and Development Commission (BCDC) and U.S. Army Corps of Engineers permits limit the maximum annual volume of oyster shell mined to 80,000 cy (40,000 tons). Table 2-2 shows the actual annual volumes of oyster shell mined by LTB from 2006 through December 2017.

Table 2-2. Annual Shell Mining Volumes (2006-2017)

Year	Volume Mined		No. Mining Episodes
	tons	cubic yards	
2006	32,771	65,542	67
2007	31,809	63,618	61
2008	29,916	59,832	59
2009	27,758	55,516	54
2010	33,108	66,216	61
2011	31,255	62,510	59
2012	33,196	66,392	68
2013	36,017	72,034	64
2014	32,394	64,788	50
2015	29,509	59,018	31
2016	30,838	61,676	34
2017	26,120	52,240	18

Source: Lind Tug and Barge (2017)

Table 2-3 illustrates the average monthly shell volumes mined by LTB from 2006 through 2017 and a projected future distribution of mining events. Seasonal distribution from 2006 through 2017 was relatively constant, with monthly totals ranging between 6.4 and 10.5 percent of total permitted volumes. For future events, LTB proposes a 2-month seasonal curtailment of mining (no mining activities) between February and June of the calendar year. Prior to January 31 of each year, the Applicant shall request California Department of Fish and Wildlife to determine the appropriate 2-month window to ensure the curtailment is consistent with seasonal avoidance windows in other regions of the San Francisco Bay to avoid take of state listed species. **(APM-4)**. LTB proposes to cease mining activity in these months to prevent larval or life stage of these species of concern within the South Bay from entering the drag head or wash water. Mining would be spread throughout the remaining months, with periods of inventory buildup and recovery if required to maintain appropriate inventory of shell product.

Table 2-3. Average/Projected LTB Monthly Mining Volumes

Month	Average Volumes (2006-2017)			Projected Future Volumes		
	tons	cubic yards	% Annual Total	tons	cubic yards	% Annual Total
January	3,066	6,132	9.8	6,240	12,480	15.6
February	3,287	6,574	10.5	0	0	0
March	2,486	4,972	8.0	0	0	0
April	2,573	5,146	8.2	6,240	12,480	15.6
May	2,491	4,982	8.0	2,560	5,120	6.4
June	2,958	5,916	9.5	6,240	12,480	15.6
July	2,554	5,108	8.2	0	0	0
August	3,035	6,070	9.7	6,240	12,480	15.6
September	2,060	4,120	6.6	0	0	0
October	2,370	4,740	7.6	6,240	12,480	15.6
November	1,986	3,972	6.4	0	0	0
December	2,358	4,716	7.6	6,240	12,480	15.6
Total	**31,224**	**62,448**	**100.0**	**40,000**	**80,000**	**100.0**

Source: Lind Tug and Barge (2017)
Notes: Percentages may not add up to 100 percent due to rounding. Except for no mining activity in February and March, the projected average mining volumes and events in this table illustrate a likely scenario only; distribution of actual volumes would vary due to equipment and personnel availability.

2.5 APPLICANT PROPOSED MEASURES

As shown in Table 2-4, the Project includes six APMs that CSLC-contracted monitors or CSLC staff will monitor (see Section 4, *Mitigation Monitoring Program*).

Table 2-4. Summary of Applicant Proposed Measures (APMs)

Air Quality and Greenhouse Gas Emissions	**APM-1**: Replacement of Tier-0 and Tier-1 Pump Engines with Electric Motors
	APM-2: Electrification of the Mining Pumps with a Tier-4 Diesel Generator
Biological Resources	**APM-3**: Periodic Bathymetric Surveys
	APM-4: Seasonal Curtailment of Mining
Hydrology and Water Quality	**APM-5**: Water Quality Wash Water Plume Study within First 2 Years of New Permits
Recreation and Transportation/Traffic	**APM-6**: Local Notice to Mariners

3.0 ENVIRONMENTAL CHECKLIST AND ANALYSIS

This section contains the Initial Study that was completed for the proposed Lind Tug and Barge, Inc. Oyster Shell Mining Project (Project) in accordance with the requirements of the California Environmental Quality Act (CEQA). The Initial Study identifies site-specific conditions and impacts, evaluates their potential significance, and discusses ways to avoid or lessen impacts that are potentially significant. The information, analysis, and conclusions included in the Initial Study provide the basis for determining the appropriate document needed to comply with CEQA. For the Project, based on the analysis and information contained herein, California State Lands Commission (Commission or CSLC) staff has found that the Initial Study shows that there is substantial evidence that the Project may have a significant effect on the environment, but revisions to the Project would avoid the effects or mitigate the effects to a point where clearly no significant effect on the environment would occur. As a result, the CSLC staff has concluded that a Mitigated Negative Declaration (MND) is the appropriate CEQA document for the Project.

As part of the current oyster shell mining operations within the South San Francisco Bay (South Bay), the Applicant employs measures to avoid or minimize potential adverse effects to aquatic resources and air quality. The aquatic resources measures provide increased protection within the South Bay for listed salmonids and smelt and their critical habitat as well as other species. The APMs for air quality include accelerated equipment upgrades to Tier 4 levels several years before required change-out dates. These measures and additional Applicant Proposed Measures (APMs) are included as part of the Project description evaluated in this Initial Study/MND.

The evaluation of environmental impacts provided in this Initial Study is based in part on the impact questions contained in Appendix G of the State CEQA Guidelines. These questions, which are included in an impact assessment matrix for each environmental category (Aesthetics, Agriculture/Forestry Resources, Air Quality, Biological Resources, etc.), are "intended to encourage thoughtful assessment of impacts." Each question is followed by a check-marked box with column headings that are defined below.

Potentially Significant Impact	This column is checked if there is substantial evidence that a Project-related environmental effect may be significant. If there are one or more "Potentially Significant Impacts," an Environmental Impact Report (EIR) would be prepared.
Less than Significant Impact	This column is checked when the Project may result in a significant environmental impact, but the incorporation of identified Project revisions or mitigation measures would reduce the identified effect(s) to a less than significant level.
Less than Significant Impact	This column is checked when the Project would not result in any significant effects. The Project's impact is less than significant even without the incorporation of Project-specific mitigation measures.
No Impact	This column is checked when the Project would not result in any impact in the category or the category does not apply.

The environmental factors checked below would be potentially affected by this Project; a checked box indicates that at least one impact would be a "Potentially Significant Impact" except that the Applicant has agreed to Project revisions, including the implementation of mitigation measures, that reduce the impact to "Less than Significant with Mitigation."

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural and Paleontological Resources	☒ Cultural Resources - Tribal
☐ Geology and Soils	☐ Greenhouse Gas Emissions	☒ Hazards and Hazardous Materials
☐ Hydrology and Water Quality	☐ Land Use and Planning	☐ Mineral Resources
☐ Noise	☐ Population and Housing	☐ Public Services
☐ Recreation	☐ Transportation/Traffic	☐ Utilities and Service Systems
☒ Mandatory Findings of Significance		

Detailed descriptions and analyses of impacts from Project activities and the basis for their significance determinations are provided for each environmental factor on the following pages, beginning with Section 3.1, *Aesthetics*. Relevant laws, regulations, and policies potentially applicable to the Project are listed in the Regulatory Setting for each environmental factor analyzed in this Initial Study and Appendix A. Impacts are analyzed either within each Project work segment or for the entire Project (all segments as a whole).

AGENCY DETERMINATION

Based on the environmental impact analysis provided by this Initial Study:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Christopher Huitt, M.S., Senior Environmental Scientist — Date
Division of Environmental Planning and Management
California State Lands Commission

3.1 AESTHETICS

AESTHETICS – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

3.1.1 Environmental Setting

The proposed oyster shell mining project occurs in the South Bay, north of the San Mateo Bridge. The mining site is in open water. The barges and tug used in oyster mining would be visible to the public during mining operations from the San Mateo Bridge and during transit to and from the offloading and processing facilities to the South Bay mining lease. Visual effects of these activities are similar to many other commercial shipping activities in the San Francisco Bay Area. The project would not include any new structures.

3.1.2 Regulatory Setting

Federal and state laws and regulations pertaining to aesthetics and relevant to the Project are identified in Appendix A. At the local level, no goals, policies, or regulations are applicable to this issue area for the Project due to its offshore location and the nature of the marine activity.

3.1.3 Impact Analysis

a) Have a substantial adverse effect on a scenic vista?

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

a) – d) No Impact. The proposed continuation of current mining activity occurs just north of the San Mateo Bridge within the open-water areas of the South Bay. The Project involves the use of one tugboat, one dredging barge, and one hopper barge operating on a 1,560-acre site. No structures would be built. Upgrades to mining equipment identified in the Project description result in a 58 percent reduction in mining events and a 39 percent decrease in mining hours annually, which will reduce the time the equipment is visible to the public. Therefore, the aesthetic effects of the Project are less than significant. No mitigation is required.

3.1.4 Mitigation Summary

The Project would not result in significant impacts to aesthetics of the South Bay; therefore, no mitigation is required.

3.2 AGRICULTURE AND FORESTRY RESOURCES

AGRICULTURE AND FORESTRY RESOURCES[3] - Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Natural Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Pub. Resources Code, § 12220, subd. (g)), timberland (as defined by Pub. Resources Code, § 4526), or timberland zoned Timberland Production (as defined by Gov. Code, § 51104, subd. (g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

3.2.1 Environmental Setting

The proposed oyster shell mining site is in an open-water area of the South Bay (Figure 1-1) north of the San Mateo Bridge. The lease area is entirely subtidal with no agriculture or forested land present.

3.2.2 Regulatory Setting

No federal or state laws and regulations pertaining to agriculture and forestry resources are relevant to the Project.

[3] In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the State's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and the forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board (CARB).

3.2.3 Impact Analysis

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Natural Resources Agency, to non-agricultural use?

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Pub. Resources Code, § 12220, subd. (g)), timberland (as defined by Pub. Resources Code, § 4526), or timberland zoned Timberland Production (as defined by Gov. Code, § 51104, subd. (g))?

d) Result in the loss of forest land or conversion of forest land to non-forest use?

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

a) – e) No Impact. The Project is located within the South Bay in an open-water location and is subtidal. No terrestrial lands or agricultural activity occur within the mining lease area. No forestry resources are in the project area. No impacts are identified to agricultural or forested areas.

3.2.4 Mitigation Summary

The Project would result in no impact to agriculture or forestry resources in South San Francisco Bay; therefore, no mitigation is required.

3.3 AIR QUALITY

AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

3.3.1 Environmental Setting

3.3.1.1 Local Climate and Meteorology

The Project site is in the South Bay, Alameda and San Mateo Counties, which are part of the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB is comprised of complex terrain types, including coastal mountain ranges, inland valleys, and San Francisco Bay. The SFBAAB is generally bordered on the west by the Pacific Ocean, on the north by the Coast Ranges, and on the east and south by the Diablo Range. Meteorological conditions in the SFBAAB are warm and mainly dry in summer, and mild and moderately wet in winter. Marine air has a moderating effect on the climate throughout much of the year. Winds flow through the Golden Gate from the Pacific Ocean, but direct flow into eastern Alameda County is impeded by the East South Bay hills. Marine air is mostly blocked from the area until late afternoons or on days when deep marine inversions develop with strong onshore flows.

The determination of whether a region's air quality is healthful or unhealthful is made by comparing contaminant levels in ambient air samples to California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS). Both the California Air Resources Board (CARB) and U.S. Environmental Protection Agency (USEPA) ambient air concentrations are monitored throughout the SFBAAB to designate an area's attainment status with respect to the CAAQS and NAAQS, respectively, for criteria air pollutants. These designations identify areas with air quality problems and

thereby initiate planning efforts for improvement. The three basic designation categories are “nonattainment,” “attainment,” and “unclassified” (the latter is used in an area that cannot be classified based on available information as meeting or not meeting the standards). Table 3.3-1 lists attainment designations with respect to the SFBAAB. With respect to the CAAQS, the SFBAAB is designated as a nonattainment area for ozone (O_3) and particulate matter less than 10 and 2.5 micrometers (PM_{10} and $PM_{2.5}$). With respect to the NAAQS, the SFBAAB is designated as a marginal nonattainment area for O_3 and $PM_{2.5}$. The SFBAAB is an attainment or unclassified area for all other pollutants.

Airflow plays an important role in the movement and dispersion of air pollutants in the region. The speed and direction of local winds are controlled by the location and strength of the Pacific high-pressure system and other global patterns, topographical factors, and circulation patterns resulting from temperature differences between the land and sea. During the spring and summer, when the Pacific high-pressure system attains its greatest strength, onshore winds from the northwest generally prevail during the day. As evening approaches, onshore winds die down, and the wind direction reverses with weak winds flowing down the coastal mountains and valleys to form light easterly breezes. In the fall, onshore surface winds decline, and the marine layer grows shallow, allowing an occasional reversal to a weak offshore flow. Under such conditions, pollutants may accumulate over the ocean and be carried back onshore with the return of sea breezes.

Normally, air temperatures in the atmosphere decrease as altitude increases. A reversal of this temperature gradient can occur at varying distances above the earth's surface. Such a condition, called an inversion, is simply a warm layer of air over a layer of cooler air. Inversions can have the effect of limiting the vertical dispersion of air pollutants, trapping them near the earth's surface.

The nearest air monitoring station for the offshore area is in a commercial/industrial zone in Redwood City bordered by U.S. Highway 101 on one side and residential areas on the other three sides. Generally, Redwood City characterizes an area between South San Francisco and Palo Alto, which has a low air pollution potential due to frequent sea breezes. Although the sea breeze typically keeps pollution levels low, when winds are light, high pollution levels can occur due to the large number of sources in the area. The Redwood City site monitors for O_3, Nitric oxides (NO_x), carbon monoxide (CO), particulate matter (PM), toxics, and ultrafine particles (Table 3.3-2). Nitrogen dioxide (NO_2) and O_3 are monitored because the area is a large source of O_3 and O_3 precursors. Carbon monoxide is monitored because of the high traffic volume in the area with U.S. Highway 101, 0.3 mile north of the site. $PM_{2.5}$ is monitored because light winds combined with surface-based inversions during the winter months can elevate particulate levels. During the most recent 3 years, this site recorded one exceedance of the national 70 ppb 8-hour O_3 standard and none for $PM_{2.5}$, NO_2 or CO.

Table 3.3-1. NAAQS, CAAQS, and SFBAAB Attainment Status

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Status	Primary	Status
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Nonattainment	—	—
	8 Hours	0.070 ppm (137 µg/m^3)	Nonattainment[9]	0.070 ppm (147 µg/m^3)	Nonattainment[4]
Respirable Particulate Matter (PM_{10})	24 Hours	50 µg/m^3	Nonattainment	150 µg/m^3	Unclassified
	AAM	20 µg/m^3	Nonattainment[7]	—	—
Fine Particulate Matter ($PM_{2.5}$)	24 Hours	—	—	35 µg/m^3 [10]	Nonattainment
	AAM	12 µg/m^3	Nonattainment[7]	12.0 µg/m^3 [15]	Attainment/ Unclassified
Carbon Monoxide (CO)	8 Hours	9.0 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Attainment[6]
	1 Hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Attainment
Nitrogen Dioxide (NO_2)[7]	AAM	0.030 ppm (57 µg/m^3)	Attainment	0.053 ppm (100 µg/m^3)	Attainment
	1 Hour	0.18 ppm (339 µg/m^3)	Attainment	0.100 ppm (188 µg/m^3)[11]	Unclassified
Sulfur Dioxide (SO_2)[12]	24 Hours	0.04 ppm (105 µg/m^3)	Attainment	0.14 ppm (365 µg/m^3)	Attainment
	1 Hour	0.25 ppm (655 µg/m^3)	Attainment	0.075 ppm (196 µg/m^3)	Attainment
	AAM	—	—	0.030 ppm (80 µg/m^3)	Attainment
Lead (Pb)[13]	30-Day Average	1.5 µg/m^3	Attainment	—	—
	Calendar Quarter	—	—	1.5 µg/m^3	Attainment
	Rolling 3-Month Average [14]	—	—	0.15 µg/m^3	Attainment[14]
Visibility-Reducing Particles (VRP)[11]	8 Hours	See footnote[8]	Unclassified	No national standards	
Sulfates	24 Hours	25 µg/m^3	Attainment		
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (42 µg/m^3)	Unclassified		
Vinyl Chloride (C_2H_3Cl)	24 Hours	0.010 ppm (26 µg/m^3)	No information available		

Source: Bay Area Air Quality Management District (2015).

Acronyms: mg/m^3 = milligrams per cubic meter; ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter; AAM = Annual Arithmetic Mean; CARB = California Air Resources Board; NAAQS = National Ambient Air Quality Standards; SIP = State Implementation Plan; USEPA = U.S. Environmental Protection Agency.

Table 3.3-1. NAAQS, CAAQS, and SFBAAB Attainment Status

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Status	Primary	Status

Notes:

[1] California standards for O_3, CO (except Lake Tahoe), SO_2 (1-hour and 24-hour), NO_2, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, lead, H_2S and C_2H_3Cl are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average.

[2] National standards shown are the "primary standards" designed to protect public health. National standards other than for O_3, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent 3-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour O_3 standard is attained when the 3-year average of the 4th highest daily concentrations is 0.075 ppm (75 ppb) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m^3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m^3. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.

[3] National air quality standards are set by the USEPA at levels determined to be protective of public health with an adequate margin of safety.

[4] Final designations effective July 20, 2012.

[5] The national 1-hour O_3 standard was revoked by the USEPA on June 15, 2005.

[6] In April 1998, the Bay Area was redesignated to attainment for the national 8-hour CO standard.

[7] In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.

[8] Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

[9] The 8-hour California ozone standard was approved by CARB in 2005 effective May 17, 2006.

[10] On January 9, 2013, the USEPA issued a final rule to determine that the Bay Area attains the 24-hour $PM_{2.5}$ national standard. This USEPA rule suspends key SIP requirements as long as monitoring data continue to show that the Bay Area attains the standard. Despite this USEPA action, the Bay Area would continue to be designated as “non-attainment” for the national 24-hour $PM_{2.5}$ standard until such time as the Air District submits a “redesignation request” and a “maintenance plan” to the USEPA, and the USEPA approves the proposed redesignation.

[11] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

[12] On June 2, 2010, the USEPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO_2 NAAQS however must continue to be used until 1 year following the USEPA’s initial designations of the new 1-hour SO_2 NAAQS.

[13] CARB has identified lead and C_2H_3Cl as “toxic air contaminants” with no threshold level of exposure below which there are no adverse health effects determined.

[14] National lead standards, rolling 3-month average: Final designations effective December 31, 2011.

[15] In 2012, the USEPA strengthened the annual $PM_{2.5}$ NAAQS from 15.0 to 12.0 µg/m^3. In December 2014, the USEPA issued final area designations for the 2012 primary annual $PM_{2.5}$ NAAQS. Areas designated “unclassifiable/attainment” must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard is April 15, 2015.

Table 3.3-2. Criteria Air Pollutants Data Summary (Redwood City Station)

Pollutant	Averaging Time	Applicable Standard	2012	2013	2014	2015	2016
Ozone (O_3)	1 Hour	Maximum Concentration (ppm)	0.063	0.083	0.086	0.086	0.075
		Days > CAAQS (0.09 ppm)	0	0	0	0	0
	8 Hours	Maximum Concentration (ppm)	0.055	0.076	0.066	0.071	0.075
		Days > NAAQS (0.075 ppm)	0	0	0	0	0
		Days > CAAQS (0.07 ppm)	0	1	0	1	1
Particulate Matter (PM_{10})	24 Hours	Maximum Concentration ($\mu g/m^3$)	59.6	58.1	61.33	58.0	41
		Days > CAAQS (50 $\mu g/m^3$)	6.1	15.2	12.8	3.0	0
		Days > NAAQS (150 $\mu g/m^3$)	0	0	0	0	0
	Annual	State Annual Average (20 $\mu g/m^3$)	18.8	22.2	20.0	21.9	18.3
Carbon Monoxide (CO) [1]	1 Hour	Maximum Concentration (ppm)	4.0	3.6	3.2	3.4	2.2
		Days > CAAQS (20 ppm)	0	0	0	0	0
		Days > NAAQS (35 ppm)	0	0	0	0	0
	8 Hours	Maximum Concentration (ppm)	1.8	1.6	1.6	1.6	1.1
		Days > CAAQS (9.0 ppm)	0	0	0	0	0
Nitrogen Dioxide (NO_2)	1 Hour	Maximum Concentration (ppm)	0.060	0.054	0.055	0.048	0.046
		Days > CAAQS (0.18 ppm)	0	0	0	0	0
	Annual	Arithmetic Average (0.053 ppm)	0.011	0.012	0.011	0.011	0.009

Sources: California Air Resources Board (2016a) and U.S. Environmental Protection Agency (2016).
Acronyms: CAAQS = California Ambient Air Quality Standards; µg/m3 = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standards; ppm = parts per million; n/a = sufficient data not available to determine the value.
Notes:
[1] 8-hour CO averages and related statistics are available at Bethel Island Road between 1981 and 2012. 1-hour CO monitored data are from U.S. Environmental Protection Agency AirData Website: www.epa.gov/airdata/ad_rep_mon.html.
* There were no recorded concentrations above NAAQS for the time period.
* Ambient data for SO_2 and airborne lead are not included in this table since the Basin is currently in compliance with state and federal standards for these pollutants.

3.3.1.2 Criteria Air Pollutants

Criteria air pollutants are those contaminants for which state and federal ambient air quality standards have been established for the protection of public health and welfare. Criteria pollutants include O_3, CO, NO_X, sulfur dioxide (SO_2), $PM_{2.5}$, and particulate matter with a diameter of 10 µ or less (PM_{10}).

- **Ozone.** O_3 is classified as a secondary or regional pollutant since is not emitted directly into the atmosphere, but is formed in the atmosphere through a series of complex photochemical reactions involving NO_X, reactive organic gases (ROG) (also known as reactive organic compounds [ROCs]), and sunlight occurring over several hours. Because O_3-forming reactions take time, peak O_3 levels are often

found downwind of major source areas. O_3 is considered a respiratory irritant and prolonged exposure can reduce lung function, aggravate asthma, and increase susceptibility to respiratory infections. Children and those with existing respiratory diseases are at greatest risk from exposure to O_3 (CARB 2010, CARB 2016b).

- **Carbon Monoxide.** CO is primarily formed through the incomplete combustion of organic fuels. Higher CO values are generally measured in winter when morning surface inversions limit dispersion. Seasonal and diurnal meteorological variations lead to lower values in summer and in the afternoon. CO is an odorless, colorless gas that affects red blood cells in the body by binding to hemoglobin and reducing the amount of oxygen that can be carried to the body's organs and tissues. CO can cause health effects, especially to those with cardiovascular disease, and affect mental alertness and vision (CARB 2010, CARB 2016b).
- **Nitric Oxide.** Nitric oxide (NO) is a colorless gas formed during combustion processes which rapidly oxidizes to form nitrogen dioxide (NO_2), a brownish gas. The highest NO_2 values are generally measured in urbanized areas with heavy traffic. Exposure to NO_2 may increase the potential for respiratory infections in children and cause difficulty in breathing even among healthy persons and especially among asthmatics (CARB 2010, CARB 2016b).
- **Sulfur Dioxide.** SO_2 is a colorless, reactive gas that is produced by burning sulfur-containing fuels, such as coal and oil, and by other industrial processes. Generally, the highest concentrations of SO_2 are found near large industrial sources. SO_2 is a respiratory irritant that can cause narrowing of the airways, leading to wheezing and shortness of breath. Long-term exposure to SO_2 can cause respiratory illness and aggravate existing cardiovascular disease (CARB 2010, CARB 2016b).
- **Particulate Matter.** Both PM_{10} and $PM_{2.5}$ consist of particles suspended in the air, such as metal, soot, smoke, dust, and fine minerals. Depending on the particulate source, toxicity and chemical activity can vary. Particulate matter is a health concern, because when inhaled, it can cause permanent damage to the lungs. The primary sources of PM_{10} emissions appear to be soil via roads, construction, agriculture, and natural windblown dust; other sources include sea salt, particulate matter released during combustion processes (e.g., those in gasoline or diesel vehicles), and wood burning. Fugitive emissions from construction sites, wood stoves, fireplaces, and diesel truck exhaust are primary sources of $PM_{2.5}$. Both sizes of particulates can be dangerous when inhaled; however, $PM_{2.5}$ tends to be more damaging because it remains in the lungs once inhaled (CARB 2005). Diesel Particulate Matter (DPM) is a toxic air contaminant (TAC) that is released during the conduction of diesel fuels. According to CARB, 70 percent of the cancer risk in California caused by toxic air contaminates is related to DPM. Aside from being toxic, DPM exposure is also known to exacerbate asthma and allergy symptoms (CARB 2010, CARB 2016b).

In accordance with the State and Federal Clean Air Acts, air pollutant standards are identified for six criteria air pollutants: ozone, CO, PM, NO_2, SO_2, and lead. These pollutants are regulated by developing specific criteria based on public health and welfare as the basis for setting permissible levels. In general, the SFBAAB experiences low concentrations of most pollutants when compared to federal or state standards. The SFBAAB is designated as either in attainment or unclassified for most criteria pollutants except for ozone, $PM_{2.5}$, and PM_{10}, for which these pollutants are designated as non-attainment for either state or federal standards (see Table 3.3-1 above).

Regional air pollution is largely a cumulative impact in that no single project is sufficient in size to, by itself, result in non-attainment of air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality impacts. If a project's incremental contribution to cumulative air quality impacts is considerable, then the project's impact on air quality would be considered significant. Land use projects may contribute to regional criteria air pollutants during project construction and operation. Table 3.3-3 identifies air quality significance thresholds based on the Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines.

Table 3.3-3. Criteria Air Pollutant and Health Risk Significance Thresholds

Pollutant	Construction	Operational	
	Average Daily Emissions (pounds/day)		Maximum Annual Emissions (tons/year)
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
Fugitive Dust	Construction Dust Ordinance/other Best Management Practices	Not Applicable	
Risk/Hazards for new sources and receptors **(Individual Project)**	Same as Operational Thresholds	Compliance with Qualified Community Risk Reduction Plan **OR** Increased cancer risk of > 10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient $PM_{2.5}$ increase: > 0.3 µg/m^3 annual average	
Risk/Hazards for new sources and receptors **(Cumulative Threshold)**	Same as Operational Thresholds	Compliance with Qualified Community Risk Reduction Plan **OR** Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) $PM_{2.5}$: > 0.8 µg/m3 annual average (from all local sources)	

Source: Bay Area Air Quality Management District (2015)
Acronyms: µg/m^3 = micrograms per cubic meter; NO_X = nitric oxides; PM_{10} = particulate matter with aerodynamic diameter less than 10 microns; $PM_{2.5}$ = particulate matter with aerodynamic diameter less than 2.5 micrometers; ROG = reactive organic gases.

Projects that generate criteria air pollutant emissions below these thresholds would not violate an air quality standard, contribute substantially to an air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants within the SFBAAB.

3.3.1.3 Local Health Risks and Hazards

In addition to criteria air pollutants, individual projects may emit TACs, a diverse group of air pollutants that can cause chronic (i.e., long duration) and acute (i.e., severe but short-term) adverse effects to human health, including birth defects, neurological damage, and cancer. Unlike criteria air pollutants, TACs do not have ambient air quality standards but are regulated by the BAAQMD using a risk-based approach to determine which sources and pollutants to control and the degree of control. The BAAQMD CEQA Air Quality Guidelines establish a relevant zone of influence for an assessment of project-level and cumulative health risks to sensitive receptors within 1,000 feet of a project site from exposure to TACs. Project construction-related or operational TAC impacts to sensitive receptors within the zone of influence that exceed any of the following thresholds are considered significant:

- An excess cancer risk level of more than 10 in one million or a non-cancer hazard index greater than 1.0.
- An incremental increase of greater than 0.3 micrograms per cubic meter (µg/m3) for annual average $PM_{2.5}$ concentrations.

Cumulative impacts from TACs emitted from freeways, highways, or high volume roadways (i.e., the latter defined as having traffic volumes of 10,000 vehicles or more per day or 1,000 trucks per day), and from all BAAQMD-permitted stationary sources within the zone that exceed any of the following thresholds at any sensitive receptor are considered cumulatively significant:

- A combined excess cancer risk level of more than 100 in one million
- A combined non-cancer hazard index greater than 10.0
- A combined incremental increase in annual average $PM_{2.5}$ concentrations greater than 0.8 µg/m^3

Sensitive Receptors

Some receptors are more susceptible to potential health impacts from poor air quality than others due to proximity to emissions sources or duration of exposure to air pollutants. The BAAQMD also identifies a sensitive receptor as “facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals and residential areas.” Recreational uses may also be considered sensitive due to the greater exposure to ambient air quality conditions because people engaging in

vigorous exercise have higher breathing rates. Land surrounding the Project site consists primarily of tidelands within the South Bay. The nearest residential sensitive receptors are approximately 3 miles to the southwest in Foster City, San Mateo County.

3.3.2 Regulatory Setting

Federal and state air quality laws and regulations relevant to the Project are identified in Appendix A. The BAAQMD maintains multiple air quality monitoring stations that continually measure ambient concentrations of major air pollutants in the South Bay Area. The closest such monitoring station to the Project site is Redwood City. Operations at offloading facilities in Petaluma or Collinsville, including ground transport of materials to and from offloading facilities, are not considered part of the Project, since these facilities operate under their own air district permits to operate, and the Applicant is not seeking any changes to these existing entitlements (see Section 1.5, *Project Background, Objectives, and Scope*).[4]

3.3.2.1 Air Quality Standards

Air quality standards are specific concentrations of pollutants that are used as thresholds to protect public health and the public welfare. The USEPA has developed two sets of NAAQS; a primary standard to provide an adequate margin of safety to protect human health and a secondary standard to protect the public welfare from known or anticipated adverse effects. The CARB has developed CAAQS, which are generally lower in concentration than federal standards. California standards exist for O_3, CO, suspended PM_{10}, visibility, sulfates, lead, hydrogen sulfide, and vinyl chloride. The federal O_3 standard is based on an 8-hour averaging period (versus 1-hour), recognizing that prolonged exposure is more damaging. The federal PM standard is based on finer 2.5 µ and smaller particles (versus 10 µ and smaller), recognizing that finer particles may have a higher residence time in the lungs and cause greater respiratory illness.

3.3.2.2 Air Toxic Health Risks

Combustion of diesel fuel in internal combustion engines produces exhaust containing several compounds identified as hazardous air pollutants by the USEPA and as TACs by the CARB. Particulate matter from diesel exhaust is identified as a TAC. The CARB (2010) developed a Risk Reduction Plan to reduce PM emissions from diesel-fueled engines and vehicles to establish new emission standards, certification programs, and engine retrofit programs to control exhaust emissions from diesel engines and vehicles. The CARB has also passed fuel standards that enable diesel engines to incorporate advanced technologies to lower emission levels (e.g., a fuel sulfur limit of 15 parts per million [ppm] was phased in starting in 2006).

[4] The BAAQMD has designated the Petaluma and Collinsville plants as Nos. 118 and 2421, respectively.

3.3.2.3 Bay Area Air Quality Management District

At the regional level, the BAAQMD has jurisdiction over the nine-county SFBAAB and is responsible for attaining and maintaining air quality in the SFBAAB within federal and state air quality standards, as established by the federal and state Clean Air Acts, respectively. The BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the SFBAAB and to develop and implement strategies to attain applicable federal and state standards. The BAAQMD (2010a) adopted the most recent air quality plan, the 2010 Clean Air Plan (CAP), on September 15, 2010. The 2010 CAP serves to: (1) update the Bay Area 2005 Ozone Strategy to implement all feasible measures to reduce O_3; (2) provide a control strategy to reduce ozone, particulate matter, air toxics, and greenhouse gases (GHGs) in a single, integrated plan; and (3) establish emission-control measures to be adopted or implemented. The 2010 CAP contains the following primary goals: (1) attain air quality standards; (2) reduce population exposure and protect public health in the SFBAAB; and (3) reduce GHG emissions and protect the climate. The 2010 CAP represents the most current applicable air quality plan for the SFBAAB. Consistency with this plan is the basis for determining whether the Project would conflict with or obstruct the implementation of air quality plans.

BAAQMD (2010b) developed and adopted quantitative thresholds of significance for their CEQA guidelines in 2010 based on projected regional growth and development; however, the agency, following a legal challenge, currently recommends that lead agencies independently determine appropriate air quality thresholds of significance based on substantial evidence in the record.[5] The 2010 thresholds included in BAAQMD (2011) are used in this analysis based on the following independent determination.

- BAAQMD released the "Proposed Thresholds of Significance" in 2009, which listed proposed thresholds for criteria pollutants, GHGs, community risk and hazards, and odors. BAAQMD researched existing and projected sources of air quality contaminants and designed the 2010 thresholds to comply with state and federal standards (see Table 3.3-2 above).
- The use of the criteria pollutant thresholds for the purposes of this Project are supported by the fact that the thresholds were developed through a quantitative examination of the efficacy of fugitive dust MMs and a quantitative examination of statewide non-attainment emissions.

[5] BAAQMD's adoption of the 2010 thresholds of significance was challenged, resulting in a court-ordered ruling issued in 2012 in California Building Industry Association v. BAAQMD, Alameda County Superior Court Case No. RGI0548693. BAAQMD (2012) released updated guidelines with references to CEQA thresholds removed and later appealed the ruling. The judgment was reversed in 2013, by the State Court of Appeal, First Appellate District, which was then appealed to the California Supreme Court, which granted limited review of a portion of the California Building Industry Association's original claims. The scope of the review was limited to the question of whether or not CEQA requires an analysis of how existing environmental conditions would impact future users of a proposed project. A decision issued on December 17, 2015, stated that CEQA does not generally require an agency to consider these effects.

- Based on the substantial evidence described above, BAAQMD's analysis of the level at which a pollutant would potentially significantly affect air quality is scientifically sound, and this MND uses the thresholds for review of the Project.

3.3.3 Impact Analysis

The baseline for this air quality analysis is the level of emissions associated with the average annual level of mining activity that occurred in 2013, the year before the new lease application for oyster shell mining was submitted. These emissions are quantified and presented in Table 3.3-4 below. The tug and barge configuration diesel engines complied with CARB regulations when the new lease application process began.

Table 3.3-4. Annual Criteria Pollutant Emissions for Mining Operations

			Annual Emissions (tons per year)						
Scenario	**Year**	**Annual Engine Use (horsepower-hrs.)**	**THC**	**ROG**	**CO**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**SO_x**
Baseline	2013	1,209,506	1.56	1.58	4.45	12.34	0.84	0.77	0.01
Final	2018	833,645	0.49	0.50	3.07	2.95	0.07	0.07	0.004

Source: Keinath et al. (2018)

Between 2006 and 2013, oyster shell was mined using a self-powered tug/dredge and the small 1,038-cy capacity *South Bay* shell hopper barge. The final engine configuration emissions are used as the final proposed Project for lease consideration. The configuration from 2018 and moving forward consists of a new set of shell dredge engines in operation including a Tier 4 generator on the barge. Detailed calculations are presented in Appendix F. This analysis examines whether any increase in air emissions would occur and if any increased emissions would increase the potential human health risk associated with an additional 10 years of exposure to TACs. The hopper barge has changed from 1,038 cy up to 2,900 cy, which would allow LTB to mine oyster shell fewer times per month and year, which is projected to result in lower emissions.

Tugboat engines generate emissions of criteria pollutants. For the proposed Project, these emissions are characterized using the CARB harbor craft standard emission rates that account for deterioration and fuel corrections for California Ultralow Sulfur Diesel. To characterize dredging on-board equipment emissions, such as emissions from auxiliary engines/generators used during mining and offloading events, off-road (portable engine) emission rates were obtained from CARB 2017 Portable Engine Emission Inventory Model for most pollutants. Off-road emissions for CO_2 and SO_2 emission rates were derived from emissions and activity data from CARB OFFROAD2017 ORION Web Database. Detailed engine activity data in terms of hours of operation, model years, horsepower and load factors were provided by the Applicant and applied to develop mass emissions by scenario, calendar year and engine type.

Table 2-1 in Section 2.0, *Project Description*, identifies the mix of diesel tug and dredging engines by size (in horsepower) and model years for historic and proposed operations. As shown in Table 2-1, engines used from the baseline scenario through the final scenario have become newer and thus, emissions are expected to decrease overall from baseline to final years.

Based on the assumption that approximately 2,900 cy of oyster shell will be mined for future mining events, a maximum of 28 mining events would be conducted per year beginning in 2018. For identifying the "worst case scenario", all 28 mining events would be offloaded at the Collinsville processing facility (which is further from the lease area than the Petaluma processing facility and thus requires greater transit time and correspondingly more emissions) and have 1,053 emission period hours (40,000 tons) compared with the baseline's 1,942 emission period hours (31,224 tons) at both Petaluma and Collinsville processing facilities. The Applicant will still retain the ability to offload at both facilities but, this comparison is used to show the reduction in emission period hours at the farthest location with this maximum allowed mined volume. Therefore, the Project could eventually result in a net decrease of 33 mining events per year above baseline conditions of 61 mining episodes per year. Table 3.3-5 shows the differences in total emissions period hours for 2013, 31,224 tons, and new proposed Project operations (2018) at the maximum emission period hours of 40,000 tons.

Table 3.3-5. Average Annual Emissions Scenarios

Scenario	Year	Offload Site	Average Annual Tonnage	# Mining Events	Emissions Period (hours)				
					Transit		Mining Onsite	Sub-total	Total*
					Empty	Full			
Baseline	2013	Petaluma	8,743	17	8	9	10.5	27.5	467.5
		Collinsville	22,481	44	11	12	10.5	33.5	1,474.0
		Total	31,224	61				61	**1,941.5**
New Tug-Barge	2018	Collinsville	40,000	28	11	12	14.6	37.6	**1,052.8**
		Total	40,000	28					**1052.8**

Note: * Total emission hours = number of mining episodes x the emissions period subtotal (hours).

Factors used to calculate total emissions associated with a single mining event include transit to the lease area, mining, and transit to an offloading site (calculated emissions for the baseline and final configuration calculations are summarized in Appendix F).

- In 2013, the average time for mining and transit to and from Petaluma was 27.5 hours for a single mining event (8-hour transit time for an empty barge; 9-hour transit time for a barge full of oyster shell; and 10.5-hour average mining time). The baseline average time for mining and transit to and from Collinsville was 33.5 hours (11-hour transit time for an empty barge; 12-hour transit time for a barge full of oyster shell; and 10.5-hour average mining time).

- The new (2018) final configuration of the tug and barge requires 14.6 hours to mine the oyster shell. The difference in the mining time is due to the average tonnage and volume of the hopper barges, 519 tons (1,038 cy) for the older barge and 1,451 tons (2,900 cy) for the larger, new barge. Since less trips are required to mine the same volumes of oyster shell, total hours of emissions are significantly reduced.

The Project would not include construction activities; therefore, construction emissions are not analyzed below.

a) Conflict with or obstruct implementation of the applicable air quality plan?

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

a) and b) Less than Significant Impact. The Project does not conflict with the BAAQMD 2010 Clean Air Plan. Staff of the BAAQMD routinely monitor air quality during mining events and processing operations. All mining equipment used by LTB meets or exceeds current BAAQMD air quality emission standards.

The proposed maximum annual volume of oyster shell to be mined is the same as under the baseline, 80,000 cy. The expected level of air emissions resulting from crew transport, offloading, and shell processing will not change from the baseline. The maximum projected level of mining would be approximately 28 mining events per year with a total mining duration estimated to be 409 hours per year or 5.3 percent of the time annually. Mining events are periodic and intermittent (lasting only a matter of hours) and therefore potential environmental effects to air quality are temporary and short-duration.

As described in Section 2.0, *Project Description*, LTB is currently using a new mining barge with higher storage and greater mining efficiency resulting in a substantial reduction in the frequency and duration of mining events and total air emissions. Based on results of recent mining using the new barge, the new mining equipment is projected to reduce the frequency of mining events by 46 percent (from 61 to 28) and the duration by 54.2 percent (from 1,942 hours to 1053 hours) when compared to the environmental baseline (see Table 3.3-5 above). As recommended by BAAQMD staff, to minimize potential significant effects and reduce emissions compared to the environmental baseline conditions when mining equipment was diesel powered (the configuration change in the oyster shell mining equipment is summarized in Table 2-1), LTB also employs, or proposes to employ as part of the Project, best management practices, which include the following:

- Repowering the tug used to transport the mining barge to and from the offloading sites with a Carl Moyer / CARB Grant in 2002 using a diesel engine with nitrous oxide (N_2O) controls that meets or exceeds Tier 3 emission standards
- Modifying the newer larger mining barge to include electric motors

- Upgrading to Tier 4 emissions standards the diesel generator powers the barge mining equipment

Electrifying the oyster mining and wash water pumps is an APM (APM-1) as is the change to the Tier 4 diesel generator (APM-2).

APM-1: Replacement of Tier-0 and Tier-1 Pump Engines with Electric Motors. The Applicant will electrify the oyster mining and wash water pumps to eliminate the use of older less efficient diesel engines to drive the various pumps used for oyster shell mining. The change from diesel powered pumps to electrical motor driven pumps will greatly reduce impacts to air quality.

APM-2: Electrification of the Mining Pumps with a Tier-4 Diesel Generator. The Applicant will use one, state-of-the-art Tier-4 diesel generator to power all barge mining equipment to further contribute to a substantial reduction in air emissions when compared to the environmental baseline. The change to the Tier 4 diesel generator has been proposed and implemented by the Applicant.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

d) Expose sensitive receptors to substantial pollutant concentrations?

c) and d) No Impact. The land surrounding the Project site consists primarily of tidelands in the South Bay. The nearest residential sensitive receptors are in Foster City, San Mateo County, approximately 3 miles southwest of the site. The closest school and medical facility, which are also in Foster City, are Lakeview Montessori and Redwood Shores Medical Facility, approximately 3 miles and 5.8 miles southwest of the site, respectively.

e) Create objectionable odors affecting a substantial number of people?

No Impact. The project site is in the southern portion of the South Bay in an open-water subtidal area north of the San Mateo Bridge.

3.3.4 Mitigation Summary

The Project would not result in significant impacts to air quality in the South Bay; therefore, no mitigation is required. However, the Applicant has implemented **APM-1** and **APM-2** to further minimize effects to air quality.

- APM-1: Replacement of Tier-0 and Tier-1 Pump Engines with Electric Motor
- APM-2: Electrification of the Mining Pumps with a Tier-4 Diesel Generator

3.4 BIOLOGICAL RESOURCES

BIOLOGICAL RESOURCES – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?	☐	☐	☐	☒

3.4.1 Environmental Setting

3.4.1.1 Regional Setting

San Francisco Bay provides habitat for a variety of fish and macroinvertebrate species, which may inhabit the system year-round or on a seasonal basis. Fish species inhabiting the South Bay include northern anchovy, Pacific herring, flatfish, surfperch, gobies, sharks and rays, smelt, Chinook salmon and steelhead, and a wide variety of other

species (Baxter et al. 1999; Wang 1986, California Department of Fish and Wildlife [CDFW] unpublished data). In addition to the fish community, the South Bay also provides habitat supporting a diverse assemblage of benthic and epibenthic macroinvertebrates including clams, worms, crabs, and shrimp. Shrimp and crabs (macroinvertebrates) inhabit intertidal and subtidal areas similar to fish, have habitat requirements and preferences similar to many of the fish species (e.g., preferences for sandy substrate, rock outcroppings, etc.), and serve an important ecological role as key prey species for many of the fish inhabiting the South Bay.

3.4.1.2 Habitat Types

Factors affecting species composition and geographic distribution within the South Bay are varied but include salinity gradients; variation in water temperature, water depth, and substrate; and availability of foraging and cover habitat (e.g., pilings, rock outcroppings, submerged aquatic vegetation, and riprap). The estuarine environment within the areas adjacent to the South Bay oyster shell mining location is dynamic, varying in response to factors such as the magnitude of freshwater inflow from the Sacramento and San Joaquin river systems and other tributaries to the San Francisco Bay and resultant changes in salinity gradients, the movement of marine waters from nearshore coastal areas into and out of the South Bay on a tidal basis, wind and tidally driven current patterns, seasonal variation in water temperatures, and a variety of other physical and biological processes. The habitat uses and functions of these intertidal and subtidal areas vary in response to these physical factors as well as to differences in life-history characteristics and habitat requirements for the South Bay's wide variety of species.

The presence, abundance, and distribution of fish species in the Bay-Delta estuary is determined by numerous abiotic and biological factors (Moyle and Cech 2000). For example, physical and chemical factors such as temperature, salinity, water velocities and current patterns, substrate, habitat characteristics (e.g., rock outcroppings, emergent vegetation, etc.) and dissolved oxygen levels play important roles in determining the seasonal timing, habitat use, and spatial distribution of fish and macroinvertebrates (e.g., South Bay shrimp and crabs) within various regions of San Francisco Bay and the Delta.

Baxter et al. (1999) described the geographic distribution of various fish, shrimp, and crab species inhabiting the South Bay and their response to seasonal and geographic variation in salinity gradients and water temperature. The geographic distribution of many of these species within the South Bay is determined, in large part, by salinity tolerance and preference. Within the Bay-Delta estuary, salinities range from freshwater within the river systems to marine, as influenced by tidal exchange with nearshore coastal waters. Within the Bay-Delta estuary, freshwater and saltwater mix, forming a highly dynamic and productive estuarine habitat characterized by a wide range of salinities, both geographically and seasonally. The geographic distribution and habitat usage patterns for the fish, shrimp, and crabs inhabiting the South Bay, which may vary by different life

stages of the species, reflect in large part the response to these salinity conditions. Salinity within the estuary varies from freshwater within the creeks and rivers to full strength seawater in Central Bay near the Golden Gate. Within the South Bay, regional, localized, and seasonal variation in salinities affect the fish and macroinvertebrate species that would be present in the area where oyster shell mining occurs.

3.4.1.3 Aquatic Habitat Function and Use

Fish, shrimp, and crabs use habitats within the South Bay-Delta estuary for several functions including, but not limited to:

- Adult and juvenile foraging
- Spawning
- Egg incubation and larval development
- Juvenile nursery areas
- Migratory corridors

Among the seasonal inhabitants, many species use the Bay-Delta estuary as a spawning area or juvenile nursery habitat on either an obligatory or nonobligatory basis (Baxter et al. 1999). For obligate species, reproduction and rearing of juveniles occurs almost exclusively within a bay or estuarine environment**.** Non-obligate species may or may not inhabit the estuary during any given year. The occurrence of non-obligate species varies substantially from one year to the next within the Bay-Delta estuary. These species are typically found in the more marine areas of the estuary and are generally not abundant upstream within Suisun Bay or the marsh. Opportunistic species use the Bay-Delta estuary as an extension of their habitat based on the suitability of environmental conditions. Many species that inhabit coastal marine waters, such as northern anchovy, may opportunistically move into the estuary, including the South Bay, when conditions are favorable for reproduction, juvenile rearing, and foraging.

Anadromous species such as Chinook salmon and steelhead spawn within freshwater portions of rivers and creeks tributary to the Bay-Delta estuary. Juvenile rearing habitat for these species is also primarily within the freshwater or low-saline portions of the system. Juvenile Chinook salmon and steelhead emigrate from freshwater habitat and move downstream through the estuary, which is used primarily as a migratory corridor and short-term foraging habitat, as they move into coastal waters for rearing. Adult Chinook salmon and steelhead subsequently migrate back upstream to spawn, again using the Bay–Delta estuary as a migratory corridor. Both fall-run Chinook salmon and steelhead juveniles and adults migrate through the South Bay. Longfin smelt spawn in the freshwater reach of the lower Sacramento River, but juveniles and adults inhabit more saline areas of western Suisun Bay, San Pablo Bay, San Francisco Bay, and nearshore coastal waters. Fishery monitoring by CDFG and University of California, Davis researchers (CDFG 2009) has shown that longfin smelt are present in the South Bay

(e.g., restored salt ponds) with evidence of some limited spawning occurring in the South Bay region of the Estuary.

3.4.1.4 Essential Fish Habitat

Steelhead are the only fish species listed for protection under the California or federal Endangered Species Acts that occur in the South Bay in the general vicinity of the oyster shell mining location. The Central California Coast steelhead evolutionarily significant unit (ESU) has been listed as threatened under the ESA (62 Federal Register 159). The National Marine Fisheries Service (NMFS) considers the Chinook salmon in the project area to be part of the Central Valley fall-run and late fall-run Chinook salmon ESUs (Stern, pers. comm. 2003) and has determined that the Central Valley fall-run and late fall-run Chinook salmon ESUs do not warrant listing, but the species is considered a candidate species (64 Federal Register 50394). Other protected fish species that inhabit the Bay-Delta estuary, including delta smelt, winter-run Chinook salmon, spring-run Chinook salmon, Coho salmon, and tidewater goby have not been collected in the South Bay and are not expected to occur in the area or be adversely affected by the Project.

In addition, the Bay-Delta estuary, including South Bay, are considered essential fish habitat (EFH) for Chinook (Pacific) salmon. The Bay-Delta estuary is also EFH for other managed species. The Magnuson-Stevens Act, as amended by the Sustainable Fisheries Act of 1996 (PL 104-267), defines EFH as the waters and substrate necessary for managed fish to spawn, breed, feed, and grow to maturity.

The estuary supports a diverse assemblage of resident and migratory fish species and macroinvertebrates. Many of the species use the estuary on a seasonal basis (e.g., Pacific herring, northern anchovy, California halibut and Dungeness crab), taking advantage of favorable conditions to complete their life cycles (Baxter et al. 1999). Other species, such as Chinook salmon and steelhead, use the Bay-Delta estuary primarily as a migratory corridor between freshwater spawning and juvenile rearing areas within the creeks and rivers tributary to the estuary and the coastal marine waters.

Anadromous migratory species such as Chinook salmon, steelhead, and longfin smelt move through the Bay-Delta estuary during passage to or from freshwater and coastal marine habitats. The majority of anadromous fish species, including Chinook salmon, steelhead, striped bass, American shad, and sturgeon, migrate through the northern portion of San Francisco Bay (e.g., Central Bay, San Pablo Bay, and Suisun Bay) during their upstream and downstream migrations into the Sacramento and San Joaquin river systems. A substantially smaller proportion of anadromous fish populations migrate into the South Bay tributaries such as Stevens Creek, Guadalupe River, Coyote Creek, and others. Fall-run Chinook salmon and steelhead are known to use South Bay tributaries as spawning and juvenile rearing habitat and have been the focus of several programs

designed to improve habitat conditions and the abundance of both salmon and steelhead in these watersheds.

The California Department of Fish and Wildlife (Baxter et al. 1999; CDFW unpublished) has conducted extensive fishery surveys within the South Bay, which began in 1980 (Bay Studies) and continues to date. The fishery survey program designed and implemented by CDFW (Baxter et al. 1999) is a long-term study with data collected monthly, primarily in deeper subtidal areas, using multiple gear types including the otter trawl and mid-water trawl (beach seine and plankton nets have also been used in the past). This survey is useful as a long-term record on the regional occurrence of various species within the area and intra- and interannual variability in their abundance.

The CDFW's South Bay sampling stations were chosen for analysis that would reflect the conditions that may be affected by oyster shell mining. Three open-water stations, with data collected by otter and mid-water trawls and plankton nets, were selected to characterize the fish community inhabiting the open-water habitat within the South Bay: Stations 101, 108 and 140. It was identified in general, that the most common species of fish include northern anchovy, shiner perch, longfin smelt, white croaker, Pacific staghorn sculpin, bay goby, and plainfin midshipman. Limited plankton net data showed common species to be: northern anchovy, Pacific herring, arrow/cheekspot goby, and yellowfin goby. Crab data showed the most common species to be: Dungeness crab, Chinese mitten crab, red rock crab, graceful rock crab, and Pacific rock crab. Shrimp data showed the most common species to be: California bay shrimp, blacktail bay shrimp, blackspotted bay shrimp, oriental shrimp, and Stimpson coastal shrimp.

Shrimp and crabs, as with many of the fish species, also support recreational or commercial fisheries within the South Bay and coastal waters and, hence, are an important element of the aquatic community to be considered when evaluating potential effects of oyster shell mining on habitat quality and availability, and the population dynamics of aquatic resources that may be affected by mining activity.

Data from these and other fishery studies reflect the diverse community of fish, shrimp, and crabs that inhabit the South Bay. Pelagic species such as northern anchovy and Pacific herring are most abundant in open-water subtidal areas of the South Bay while species including topsmelt and jacksmelt are abundant in the shallow inshore habitats.

3.4.1.5 Special Status Species

The following special status species could occur at the Project site during mining.

- Steelhead (*Oncorhynchus mykiss*), consisting of the following Distinct Population Segments (DPSs)
    - Central California Coast (federally listed as threatened)
    - Central Valley (federally listed as threatened)

- Chinook salmon (*O. tshawytscha*), consisting of the following Evolutionarily Significant Units (ESUs)
  - Sacramento River winter-run (federally and state-listed as endangered)
  - Central Valley spring-run (federally and state-listed as threatened)
- Green sturgeon (*Acipenser medirostris*) Southern DPS, federally listed as threatened
- Longfin smelt (*Spirinchus thaleichthy*s), state listed as threatened

The Project site is located more than 1,000 feet from any terrestrial habitats. Therefore, impacts to terrestrial species and habitats would not occur and are not discussed further in this document.

Information on special status species potentially present in the Project site area was obtained from the following sources: (1) CDFW, Wildlife Habitat Relations System, used to identify the habitat requirements and distribution of special status species; (2) CalFish database, a California cooperative fish and habitat data program that tracks occurrence and habitat for anadromous fish; and (3) species-specific studies presented in scientific journals and other publications.

Steelhead

Steelhead are anadromous fish that are born in fresh water and migrate into the ocean to mature before returning to freshwater to spawn. The amount of time that steelhead spend in freshwater during their lives varies greatly. Throughout their range, individuals typically remain at sea for one to four growing seasons before returning to freshwater to spawn (Burgner et al. 1992). The spawning season for steelhead extends from late December through April of the following year, although they will often move up coastal streams in the fall and then hold in deep pools until the spawning period.

Steelhead likely enter the South Bay in early winter in preparation for the spawning migration. However, little is known about transit times and migratory pathways of steelhead within San Francisco Bay. Results from a study of outmigration and distribution of juvenile hatchery-raised steelhead released in the lower Sacramento River (Klimley et al. 2009) show that from 2008-2009 steelhead spend an average of 2.5 days in transit time within San Pablo and San Francisco bays. The study concluded that transit time was greater in the upper estuary than in the lower estuary within San Francisco Bay (Klimley et al. 2009). This could be due to the lower salinity in the upper estuary which serves as a transition zone between freshwater and saltwater, allowing steelhead to transition from freshwater to saltwater. Once steelhead reach San Francisco Bay, salinities are similar to ocean water, which may lead steelhead to spend less time in this portion of the estuary. Migratory pathways of juvenile steelhead were largely inconclusive due to equipment loss and data gaps. A review of literature and the CalFish database, a California cooperative

fish and habitat data program, verify that steelhead are known to spawn in several drainages of San Francisco Bay including Coyote Creek, the Guadalupe River, and San Francisquito Creek. They are likely to occur throughout the Sacramento–San Joaquin River Delta (Delta) and San Francisco Bay during the migration season of December 1 through May 31 of the following year (CalFish 2013). For all these reasons, both steelhead DPSs have the potential to be present in the marine portions of the Project site, although at low densities.

Chinook Salmon

Chinook salmon are also anadromous fish. Adult Chinook salmon spend up to 5 years in the ocean before returning to their natal stream to spawn. The Sacramento River winter-run Chinook salmon are likely to occur throughout the Delta and San Francisco Bay during periods of migration (CalFish 2013). A 1997 study conducted by the NMFS Tiburon Laboratory found that residency time of juvenile Sacramento River winter-run Chinook salmon within the San Francisco Bay Estuary was about 40 days, with little growth occurring at that time (NMFS 2001). This would indicate that juvenile Sacramento River winter-run Chinook salmon do not spend much time foraging in the South Bay before moving to the ocean. Sacramento River winter-run Chinook salmon are assumed to be present in the marine portions of the Project site, at low densities during the upstream and downstream migration period.

The Central Valley spring-run Chinook salmon are likely to occur throughout the Delta and the northern portion of San Francisco Bay during periods of migration (CalFish 2013). Central Valley spring-run Chinook salmon do not spawn in the South Bay and their typical migration routes between the ocean and the Sacramento River are likely similar to that of Sacramento River winter-run Chinook salmon. For this reason, the Central Valley spring-run Chinook salmon are assumed to be present in the marine portions of the Project site, at low densities during the upstream and downstream migration period.

Green Sturgeon

Another anadromous species is the green sturgeon. Juveniles rear in freshwater for as long as 2 years before migrating to sea. Green sturgeon are thought to spawn every 3 to 5 years in deep pools with turbulent water velocities and prefer cobble substrates but can use substrates ranging from clean sand to bedrock. Once green sturgeon emigrate from freshwater, they disperse widely and are considered the most broadly distributed and wide-ranging species of the sturgeon family. Juvenile green sturgeon occur throughout the Sacramento River Delta and San Francisco Bay (CalFish 2013). Adults are found throughout the San Francisco Bay and Delta during periods of migration, while juveniles are present in the South Bay year-round, mostly south of the Dumbarton Bridge. CDFW estimates that one-fifth of the sturgeon landed in the estuary are green sturgeon and the

rest are white sturgeon (Moyle 2002). Green sturgeon have the potential to be present throughout all marine portions of the Project site throughout the year.

Longfin Smelt

Longfin smelt are native within the San Francisco Estuary, including the Delta, Suisun Bay, and San Francisco Bay (CDFG 2009). Longfin smelt spawning primarily occurs between February and April in areas with low salinity; however, spawning can occur between early-November to late-June (Moyle 2002; CDFG 2009). There are no current data on specific spawning locations in San Francisco Bay; however, Rosenfield and Baxter (2007) report that spawning probably occurs near the mixing zones between fresh and brackish water. According to Moyle (2002), populations of longfin smelt in California have historically been known from the San Francisco estuary. Adults occur seasonally throughout San Francisco Bay, but they are concentrated in Suisun, San Pablo, and North San Francisco bays. They concentrate in most years in San Pablo Bay in April through June and become more dispersed (many moving into Central San Francisco Bay) in late summer. The exact distribution pattern varies from year to year. During winter months, when fish are moving upstream to spawn, high outflows may push many back into San Francisco Bay, whereas drought years may find them concentrating in Suisun Bay. The population found within San Francisco Bay represents the largest known longfin smelt population in California (Rosenfield and Baxter 2007). Longfin smelt have the potential to be present throughout the year.

3.4.1.6 Marine Mammals and Migratory Birds

The marine mammals with potential to occur within the Project vicinity are the Pacific harbor seal (*Phoca vitulina*) and the California sea lion (*Zalophus californianus*). Other species that could occur but are much less likely include the gray whale (*Eschrichtius robustus*) and harbor porpoise (*Phocoena phocoena*). None of these are federal or state listed as threatened or endangered species. However, all marine mammals are protected under the Marine Mammal Protection Act of 1972.

Migratory birds (and their eggs and nests) are protected under the Migratory Bird Treaty Act (MBTA). Common migratory birds occurring in the Project vicinity include the common loon (*Gavis immer*), American white pelican (*Pelecanus erythrorhynchos*), California brown pelican (*Pelecanus occidentalis californicus)*, double-breasted cormorant (*Phalacrocorax auritis*), Aleutian Canada goose (*Branta canadensis kucoparcia*), Barrow's golden eye (*Bucephala islandica*), California gull (*Larus californicus*), osprey (*Pandion haliaetus*), and elegant tern (*Sterna elegans*).

3.4.1.7 Non-Native Aquatic Species (NAS)

The Bay-Delta estuary has been colonized by many introduced (non-native) exotic species. Some species introductions, such as striped bass and American shad, have

been made through conscious action while most other species introductions have resulted from the inadvertent transport and release of species into the estuary. Many of the inadvertent species introductions have occurred as a result of ballast water discharges, associated with importation of oysters, as part of fouling communities on ship hulls, and through a variety of other mechanisms. The CSLC is the lead implementing agency for the State's Marine Invasive Species Program (MISP), which strives to prevent NAS release from commercial vessels to California waters. The MISP began in 1999 with the passage of California's Ballast Water Management for Control of Nonindigenous Species Act, which addressed the threat of NAS introduction through ships' ballast water. In 2003, the Marine Invasive Species Act (MISA) was passed, reauthorizing, and expanding the 1999 Act, which directed the CSLC to formulate recommendations to prevent or minimize the introduction of NAS discharges for vessels 300 gross registered tons or greater, capable of carrying ballast water, operating in State waters. All vessels that depart a California port or place are required to submit to the CSLC a Ballast Water Reporting Form that includes information about port of origin, how the ballast water was managed, and how much ballast water was discharged (CSLC 2014).

3.4.2 Regulatory Setting

Federal and state laws and regulations pertaining to this issue area and relevant to the Project are identified in Appendix A. No local goals, policies, or regulations are applicable to this issue area for the Project, due to its offshore location and the nature of the activity.

3.4.3 Impact Analysis

CEQA requires that projects analyze the potential impacts on special status plant and animal species, as well as on sensitive habitats, wildlife corridors, and waters of the United States. Impacts on wildlife species that are not considered special status under CEQA are generally not considered significant unless impacts are associated with the species' migration routes or movements, or the species are considered locally important.

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less Than Significant with Mitigation. This assessment reviewed information from investigations involving dredging and sand mining in estuarine environments (Hanson et al. 2004, ESA 2012), together with information on the species composition; and seasonal occurrence, life stage, habitat usage, and habitat functions of fish, shrimp, and crabs in the South Bay where oyster shell mining occurs. Based on this information, various factors associated with oyster shell mining that might affect these species in the area of the estuary where mining occurs were identified and then analyzed. Although there is very little scientific information specifically on the effects of oyster shell mining on fish and

aquatic habitats, a substantial body of information is available on sand mining and maintenance dredging that is directly relevant to assessing potential impact mechanisms for oyster shell mining on aquatic resources. Based on information available from the scientific literature, in combination with information on the methods and processes involved in oyster shell mining, factors associated with oyster shell mining that could adversely affect habitat conditions and fish and macroinvertebrate communities within the South Bay were identified. Factors considered were:

- Benthic disturbance
- Changes in water depth and subtidal habitat
- Exposure to increased suspended sediment concentrations and turbidity
- Exposure to contaminants
- Changes in fish movement or migration patterns
- Entrainment
- Habitat use and potential impacts
- Spread of invasive species

Benthic Disturbance

Oyster shell mining events remove benthic organisms from the mined area and disturb the South Bay bottom. There is an extensive body of scientific information available on the effects of mining and dredging activity on benthic communities and recolonization of these organisms after a mining event (Hanson et al. 2004). The physical characteristics of the benthic habitat where oyster shell mining activity occurs are consistent with information available on the species composition, abundance, and species diversity of the benthic community inhabiting these areas. Characteristically the benthic macroinvertebrate community inhabiting these naturally disturbed and high fluctuating environments include species that have short lifespans, high reproductive potential, rapid dispersal, and are able to successfully colonize disturbed habitat (e.g., weedy-type species). Results of studies conducted at other locations have shown that recolonization of subtidal areas, similar in their characteristics to South Bay, typically would begin immediately after completion of the oyster shell mining event with community recovering to pre-disturbance levels within less than 1 to 3 years, depending on location and recolonization patterns (Morris Tug and Barge, Inc. 2014). The rate of recolonization of benthic macroinvertebrates varies in response to a wide variety of factors, including the availability of organisms from surrounding undisturbed areas for recolonization and larval dispersal, the intensity of mining activities within a specific area, seasonal periods of reproduction and a variety of other factors. The effects of multiple oyster shell mining events within a localized subtidal area would also be expected to affect recolonization and recovery of the area by benthic macroinvertebrates.

Results of the analyses conducted to date have shown that any disturbance of the benthic macroinvertebrate community inhabiting the South Bay by oyster shell mining would be

localized and temporary based on rapid recolonization of organisms within the area (Morris Tug and Barge, Inc. 2014). Benthic disturbance would be limited to the CSLC lease area where oyster shell mining occurs. The estimated annual mined relic oyster shell deposits from the South Bay (which have ranged from approximately 26,000 to 36,000 tons per year in recent years) represents an annual mining rate of 0.06 percent per year of the estimated deposit of 60,000,000 tons of oyster shell in the South Bay and 0.17 to 0.33 percent per year of the estimated shell reserves in the CSLC lease area PRC 5534.1. Given the small area in the South Bay where mining occurs (Figure 1-1), and the rapid recolonization of benthic habitat following disturbance, oyster shell mining has not been identified as a significant factor affecting the benthic community in the estuary. Benthic disturbance resulting from mining represents an incremental contribution to the cumulative factors, including natural turbulence and benthic disturbance within the shallow South Bay subtidal habitats that affect the population dynamics of the estuary's benthic macroinvertebrate community.

Oyster shell mining also involves the movement of the tug and barge between the offloading and shell processing site and the South Bay mining lease area. The tug and barge transit are in open water away from shallow shoreline habitats. The tug and barge movements are typical of much of the commercial boat traffic in San Francisco Bay. Mining activity is not expected to result in long-term disturbance of terrestrial wildlife and bird species. The open-water habitat is not unique but is used by waterbirds as nesting and foraging areas. Movement of the tug and barge may result in temporary localized disturbance of a limited number of waterbirds but would not be expected to have any effect on nesting habitat. The effects from oyster shell mining on potential disturbance of wildlife are expected to be similar or less (based on an expected reduction in mining events each year) when compared to baseline conditions and therefore no significant adverse impacts have been identified.

Habitat Change

Oyster shell mining results in the localized removal of relic shell material from the subtidal area as well as a redistribution of silt and mud that is washed from the shell and returned to the area. These effects of oyster shell mining contribute to localized changes in bathymetry (water depth) and sediment grain size distribution within the area where mining occurs. The cumulative effect of oyster shell mining results in localized, and temporary, depending on sediment deposition rates, increases in water depth. As part of the Project, the Applicant has agreed to work collaboratively with the CSLC, BCDC, and other interested agencies to design and conduct periodic bathymetric surveys of the South Bay lease area to assess changes in benthic topography associated with oyster shell mining **(APM-3)**. Results of these bathymetric surveys will be helpful in assessing local changes in subtidal habitat in the South Bay area and how oyster shell mining affects subtidal bathymetry.

APM-3: Periodic Bathymetric Surveys. The Applicant will conduct bathymetric surveys to assess current and future bathymetric conditions within the lease area. The Applicant proposes to conduct further periodic bathymetric surveys beginning in 2018, then 2022 and 2026 to evaluate potential trends and impacts with regard to South Bay bathymetry. The Applicant will collaborate with regulatory agencies to develop the survey parameters.

The removal of oyster shell from the mining area results in a localized change in sediment grain size distribution as large material is mined and silt, mud, and other fine-grained sediment are returned to the area. Changes in sediment grain size distribution as a result of oyster shell mining would be expected to contribute to localized changes in the benthic habitat characteristics. Since much of the relic shell deposit is overlaid and interspersed with young bay mud the effects of localized changes in sediment grain size distribution on benthic habitat is expected to be small. Limiting oyster shell mining to the CSLC lease area substantially reduces the potential risk that oyster shell mining would result in regional changes in benthic habitat conditions that would affect the South Bay benthic community. The incremental impact of a localized change in substrate grain size distribution resulting from mining has not been identified as a significant impact to the Day-Delta benthic community.

Although small numbers of oysters occur in isolated areas within the estuary, oysters were virtually eliminated from the South Bay in the late 1800s by water pollution. An effort to reestablish oyster populations within the estuary primarily focuses on Central and North Bay areas where water quality conditions are more suitable for oysters. Oysters inhabit intertidal and shallow subtidal areas characterized by hard substrate and cold clear water (low suspended sediment concentrations). The South Bay in the area where historic oyster deposits are mined is not considered suitable habitat for oysters given the dominance of bay mud deposits and high ambient suspended sediment concentrations resulting from sediment re-suspension by wind and tidal currents and wave activity. As a result of these existing natural habitat conditions within the South Bay, continued oyster shell mining of historic deposits would not impact oyster populations or the opportunities to re-establish oysters within suitable habitat areas within other regions of the estuary.

As part of routine oyster shell mining operations within the South Bay, the Applicant employs a variety of proposed measures which are designed to avoid and minimize potential adverse effects to aquatic resources. These measures provide increased protection for all aquatic resources within the South Bay including salmonids and longfin smelt and their critical habitat.

Exposure of Fish and Macroinvertebrates to Suspended Solids

During oyster shell mining a discharge plume occurs that raises turbidity and suspended sediment levels temporarily within the localized area of the mining operation. The

potential effects of exposure to increased suspended sediment concentrations, and possibly re-suspension of anoxic sediments and organic material resulting in depressed dissolved oxygen concentrations, in the oyster shell mining discharge plume are discussed in Section 3.10, *Hydrology and Water Quality*. As described in Section 3.10, results of available water quality monitoring and analyses provide no evidence that contaminant concentrations are within a range that would result in toxicity to fish or macroinvertebrates or that oyster shell mining in the South Bay depresses dissolved oxygen concentrations to a level that would result in significant adverse effects to aquatic resources. The original 6-foot depth of the shell wash water was the depth of the discharge pipe along the bottom of the shell dredge barge. The depth of the shell wash water discharge is now approximately 4.5 feet, as the draft of the shell barge has decreased over 1-foot. The removal of several diesel engines and related equipment has decreased the weight and draft of the shell dredge barge. The subsurface discharge of the wash water will limit the spatial and temporal distribution of the discharge plume and limit it to a smaller segment of the water column. The time it is visible, and the time suspended solids are in the water column will be reduced by the discharge under the dredge barge. However, **MM BIO-1** is recommended to disperse suspended sediments within the plume

MM BIO-1: Turbidity Reduction During Mining. The oyster mining barge shall incorporate a subsurface discharge to increase dispersal (located approximately 4.5 feet below the surface) of the "overflow plume."

Existing State and federal permits regulate the annual volume of shell that can be mined from the lease area within the South Bay. These limits serve to reduce the potential risk of adverse effects of shell mining on subtidal habitat and aquatic resources. Implementation of **MM BIO-2** would ensure that the maximum oyster shell volume mined by LTB during the permit period would not exceed 80,000 cy (40,000 tons) per year.

MM BIO-2: Limited Volume per Year. The Applicant shall not mine oyster shells over the permitted volume of 80,000 cubic yards per year.

Entrainment into the Suction Pipe

During oyster shell mining, LTB uses a trailing suction method in which the suction head is located immediately below (within 2 to 3 feet of) the substrate surface. The suction head includes a vent that pulls water into the suction pipe to help create a shell-water slurry when the drag head is buried in the substrate so that seawater can be drawn through the shell substrate to facilitate pumping oyster shell onto the hopper barge. In addition to the shell suction drag head, an additional wash water pump draws water from directly beneath the bottom of the shell dredge hull, for the shell washing process. As the vents were originally unscreened, wildlife agencies raised concerns about the potential

entrainment of fish and larvae, including longfin smelt, juvenile steelhead, and Chinook salmon, during oyster shell mining.

Results of studies conducted in the Pacific Northwest show that juvenile and older life stages of fish, crabs, and bay shrimp may be entrained into a hydraulic suction maintenance dredge (Hanson et al. 2004). No information is available on the potential entrainment of fish, crabs, and shrimp into the suction pipe used during oyster shell mining by the Applicant in the South Bay. Results of fish egg and larval sampling conducted in the South Bay show that the most abundant larval fish occurring in the area are northern anchovy, Pacific herring, and gobies (Morris Tug and Barge, Inc. 2014).

Although detailed information on the vertical distribution of these and other species of larval fish within the water column is not available, results from other studies have shown that many larval fish occur primarily in the upper portions of the water column, which would appear to reduce their vulnerability to entrainment into a suction head operating near the bottom (Morris Tug and Barge, Inc. 2014). The relatively low volume of water entrained during a mining event, the fact that mining occurs in open-water subtidal habitat within the South Bay that is not considered to be unique, and the potential for behavioral avoidance of the suction pipe, particularly by mobile fish, reduces the potential biological significance of entrainment mortality as a significant factor impacting fish and macroinvertebrate populations in the estuary. In addition, fish eggs and larvae that would potentially be vulnerable to entrainment in the South Bay are characteristically widely distributed within the Bay-Delta Estuary and nearshore coastal waters, have high seasonal densities, and experience extremely high natural mortality rates, thus reducing the risk that entrainment would result in a significant adverse impact to the population abundance or dynamics of these species.

Although entrainment of fish and macroinvertebrates as a result of oyster shell mining has not been quantified, entrainment is identified as an incremental risk of mortality. To minimize and avoid potential adverse impacts of oyster shell mining through fish entrainment into the mining suction head and into the wash water system, LTB installed positive barrier fish screens on the previously unscreened openings on both the drag head and wash system intakes (Figure 2-3 [C and D]). The fish screens, which are designed to meet current smelt and salmonid standards, exclude juvenile and adult fish, and minimize the risk of entraining planktonic fish eggs and larvae into the centrifugal suction pipe. The design of the fish screens is based on a variety of factors that include guidance from the CDFW, NMFS, and U.S. Fish and Wildlife Service (USFWS) on fish screen design criteria as well as specific requirements related to the equipment used in shell mining. Because of the unique configuration of the LTB oyster mining equipment, two separate fish screens are required. Installation of the fish screen on the intake for the shell washing system required that the barge be removed from the water to install the required piping to accommodate the fish screen. The fish screens are constructed using stainless steel to avoid rust and corrosion and facilitate their long-term reliable integrity.

The Applicant proposes to implement other avoidance measures to reduce entrainment risk and other potential effects of oyster mining on South Bay biological resources. For example, larval longfin smelt and Pacific herring, and eggs and larval stages of other species, that are present during the late winter and early spring could remain vulnerable to entrainment through the wire mesh of the fish screen. To reduce and avoid entrainment risk for larval longfin smelt and herring (in addition to other species) the Applicant proposes to implement **APM-4** to curtail all oyster shell mining for a 2-month window determined by CDFW each year, thus preventing any larval or life stage of protected and other aquatic species in the South Bay from entering the drag head or the wash water during these months.

APM-4: Seasonal Curtailment of Mining. A 2-month seasonal curtailment of mining (no mining activities) will occur between February and June of the calendar year. Prior to January 31 of each year, the Applicant shall request California Department of Fish and Wildlife to determine the appropriate 2-month window to ensure the curtailment is consistent with seasonal avoidance windows in other regions of the San Francisco Bay to avoid take of state listed species.

In order for the fish screens to achieve their purpose, they must be operating at all times that mining occurs. Consequently, **MM BIO-3** is recommended.

MM BIO-3: Installation of Positive Barrier Fish Screens. The Applicant shall not conduct any oyster shell extraction within the lease area without the installation of Positive Barrier Fish Screens as approved by the California Department of Fish and Wildlife, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The screens shall be installed on the drag head arm and the wash water intake.

In addition, to minimize potential entrainment of fish, especially pelagic species including steelhead, Chinook salmon, and longfin smelt, the Applicant shall implement **MM BIO-4** to limit pumping for priming or clearing of the suction pipe to when the end of the pipe is within less than 3 feet from the bottom. The pump and pipe are required to be cleared after mining. This can be accomplished by keeping the drag head in contact with or within 3 feet of the substrate surface as part of standard operating procedures for South Bay oyster shell mining to reduce the risk of entrainment. The Applicant would also conduct compliance monitoring through the implementation of recommended **MM BIO-5**.

MM BIO-4: Limited Water Pumping Depths. When clearing the suction pipe, the Applicant shall ensure that the end of the drag head arm pipe is within 3 feet of the Bay bottom.

MM BIO-5: Mitigation Effectiveness Monitoring. The Applicant shall conduct compliance monitoring for the oyster shell mining operations to include and report the following:

- Operational logs documenting date, mining event log number, volume, lease site
- Documentation on the beginning and end location coordinates for each mining event to be provided to the California Department of Fish and Wildlife, U.S. Army Corps of Engineers, and San Francisco Bay Conservation and Development Commission so that each agency can review reporting forms
- Documentation on the duration (minutes) of pump priming and clearing for each mining event when the suction head is not in contact with the bottom substrate and pump engaged
- Visual inspection of the fish screens following each mining event to verify screen integrity, remove any impinged debris, and record any fish or macroinvertebrates impinged on the screen
- Preparation of an annual summary of mining activity and quantification of the area of suitable shallow water required to fully mitigate incidental take based on the approach and assumptions (volumetric basis for full mitigation calculations) and an accounting of the mitigation habitat area (acres) that have been purchased by the Applicant for fishery mitigation in compliance with Section 8 of the Incidental Take Permit

Effects of Underwater Noise on Marine Mammals, Fish, and Macroinvertebrates

Operation of the tug and the centrifugal suction pumps during oyster shell mining activities may generate underwater noise levels that could affect marine wildlife within or near the Project area. As discussed in Hanson et al. (2004), although the scientific literature provides only limited data on noise levels generated by mining equipment, the level of noise produced from suction dredging is likely within the sound pressure range of 130 to 140 decibels (dB) and a frequency range of 400 hertz (Hz) close to operations. These sound pressure levels (SPLs) are below thresholds that would result in physical injury or mortality to marine mammals (specifically, harbor seals and California sea lions, which may occur in the Project area), fish, and macroinvertebrates, but may exceed the continuous/non-impulsive noise threshold for behavioral disruption for marine mammals (120 dB [root-mean-square SPL]). However, because underwater noise conditions in San Francisco Bay are typically higher than this threshold, underwater noise from suction dredging would largely be masked by the higher existing ambient sound levels, and thus behavioral changes are less likely to occur. However, underwater noise resulting from Project activities is anticipated to be lower than suction dredging due to the removal of older diesel engines and replacing them with electrical motors and one diesel generator. Noise thresholds for injury and behavioral harassment of marine mammals and fish incorporated in this MND include Fisheries Hydroacoustic Working Group (2008), Caltrans (2015), and National Marine Fisheries Service (2018).

The behavioral response of harbor seals, California sea lions, and various fish to the SPLs generated during oyster shell mining may result in localized, temporary, behavioral

avoidance of the area in the immediate vicinity of the suction pipe. While behavioral avoidance of the suction pipe would result in a localized change in the distribution of fish in the immediate area (which would end as soon as oyster shell mining is complete), it would also serve to reduce the vulnerability of fish to potential entrainment during mining. Consequently, no significant adverse impacts to marine mammals, fish, and macroinvertebrates in the South Bay as a consequence of SPLs associated with the oyster shell mining activity are anticipated.

Spread of Invasive Species

Frequent disturbance of subtidal habitat areas, including both natural processes and mining activity, has the potential to favor localized short-term colonization by invasive benthic macroinvertebrates. Since many of these invasive macroinvertebrate species extensively colonize subtidal habitats within the Bay-Delta estuary, including areas where disturbance results from natural processes, many of the species serve similar ecological functions as do native species in terms of trophic energy dynamics in addition to serving as prey for many of the fish and macroinvertebrates inhabiting the system.

Equipment used for oyster shell mining does not travel outside the Project transit, mining, offloading, and mooring areas of South Bay, Collinsville, Petaluma San Francisco Pier 54, and Mare Island. The soft substrate and limited subtidal area where mining is allowed, and frequent natural disturbance of South Bay benthic habitat reduces the potential that oyster shell mining would be a significant factor affecting colonization by non-native species. Oyster shell mining equipment used by LTB is moored and operated exclusively within the South Bay, with shell offloading at sites in the Delta tributaries and therefore there is no potential for oyster shell mining to contribute to the transport or movement of invasive species or introduce new invasive species to the area.

Summary

Proposed mining activity in the South Bay would remain the same as or be reduced compared to baseline conditions, and the intensity and volume of shell mined each year would not exceed that from the maximum volume in the existing CSLC lease and other agency permits. Oyster shell mining can result in incremental effects to various aquatic species and their habitat through factors such as the risk of entrainment mortality to various life stages of fish and macroinvertebrates, localized and temporary exposure to suspended sediments within the discharge plume, localized and temporary behavioral response to noise generated during mining, localized and temporary effects resulting from benthic disturbance, and localized changes in bathymetry and sediment grain size distribution. Since mining operations would not result in large-scale changes to the population dynamics of fish and macroinvertebrate populations inhabiting the estuary or adversely impact ESA-listed species, impacts are less than significant.

The Applicant conducted early consultation with CDFW and other wildlife agencies and prepared and submitted an Administrative Draft application to CDFW for an incidental take permit (ITP) in compliance with the California Endangered Species Act. A final draft ITP application must be submitted to CDFW by LTB after adoption of the MND by the Commission. Implementation of the APMs and MMs identified above, which include installation and operation of positive barrier fish screens on both the mining suction head and the shell wash water intake on the barge, a 2-month seasonal curtailment of mining (no mining activities) will occur between February and June of the calendar year. CDFW will determine the appropriate 2-month window to ensure the curtailment is consistent with seasonal avoidance windows in other regions of the San Francisco Bay to avoid take of state listed species. The use of a subsurface overflow discharge for shell wash water will increase plume dissipation, to reduce the risk of impacts to larval longfin smelt and other eggs and larvae as part of early consultation with CDFW and other agency staffs.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less than Significant with Mitigation. Aquatic plants occur within the intertidal and shallow subtidal zones of the South Bay. Within Central Bay, eelgrass colonizes localized shallow water subtidal areas and serves important habitat and ecological functions within the estuary. Given the relatively high turbidity and suspended sediment concentrations naturally occurring within the South Bay, light penetration (photic zone) limits the occurrence of aquatic and emergent vegetation to relatively small, shallow-water areas located along the shoreline. Other factors that affect the growth of aquatic plants include erosion by wave action, both natural wave action and waves generated by shipping and recreational boating, and shoreline and benthic erosion associated with tidal currents.

Habitat in and surrounding areas of the South Bay where oyster shell mining occurs is characterized by open-water subtidal areas with virtually no rooted or emergent aquatic vegetation. Eelgrass is limited to shallow-water areas around the periphery of the South Bay. Since oyster shell mining activity is limited to an offshore open-water subtidal area (Figure 1-1), the Project would not excavate aquatic vegetation or impact any shallow wetland areas of the South Bay. Therefore, oyster shell mining would not be expected to adversely affect aquatic vegetation. Furthermore, dissipation of the discharge plume by sediment settling and turbulent dispersion, in addition to the short-duration (a period of hours) when the plume would occur, would not be expected to result in adverse indirect effects on aquatic vegetation from reductions in water clarity and photosynthetic activity. Implementation of **MM BIO-6** would limit the mining area to the lease area within the South Bay, which would avoid potential mining in sensitive habitats and concentrates mining in limited areas thereby reducing benthic disturbance and other potential effects of mining in the majority of subtidal habitats such as eelgrass beds in the South Bay.

MM BIO-6: Limited Mining Area. Oyster shell mining shall be restricted to the specific lease area designated by the California State Lands Commission in the South Bay and is not permitted outside of the lease area (PRC 5534). Oyster shell mining activities shall be monitored for location and duration activity within the lease area with a global positioning system (GPS) tracking and reporting system.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. Given the Project mining location in South Bay waters, no wetlands, as defined by Clean Water Act Section 404, would be affected by the Project. Since the South Bay is regulated like other waters of the U.S. under Section 404, the Project would require a permit under Section 404, for impacts to other waters of the U.S., as well as navigable waters under Section 10 of the Rivers and Harbors Act.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less than Significant with Mitigation. See discussion under a) above related to fish species.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?

e) and f) No Impact. The Project would not conflict with local policies or ordinances protecting biological resources or any local, regional, or state habitat conservation plans, including any adopted Habitat Conservation Plan or Natural Communities Conservation Plan; therefore, there would be no impact.

3.4.4 Mitigation Summary

Implementation of the following mitigation measure(s) and APMs would reduce the potential for Project-related impacts to Biological Resources to less than significant.

- APM-3: Periodic Bathymetric Surveys
- APM-4: Seasonal Curtailment of Mining
- MM BIO-1: Turbidity Reduction During Mining
- MM BIO-2: Limited Volume per Year
- MM BIO-3: Installation of Positive Barrier Fish Screens

- MM BIO-4: Limit Pumping Depths
- MM BIO-5: Mitigation Effectiveness Monitoring
- MM BIO-6: Limited Mining (Lease) Areas

3.5 CULTURAL AND PALEONTOLOGICAL RESOURCES

CULTURAL AND PALEONTOLOGICAL RESOURCES - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Cause a substantial adverse change in the significance of a historical resource (as defined in State CEQA Guidelines, § 15064.5)?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource (pursuant to State CEQA Guidelines, § 15064.5)?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

3.5.1 Environmental Setting

This section reviews potential significant impacts to cultural and paleontological resources in the Lind Tug and Barge Oyster Shell Mining project (Project) area. Information relevant to Tribal cultural resources is provided in Section 3.6, *Cultural Resources – Tribal*.

Oyster shell mining is restricted to an open-water subtidal area of South San Francisco Bay that has been submerged for more than 2,500 years. No cultural resources surveys cover this underwater Project area. In March 2005, during preparation of an adopted Negative Declaration associated with the issuance of CSLC Lease PRC 5534.1 (CSLC 2005), and again in March 2018 during preparation of this MND, the Northwest Information Center (NWIC) at Sonoma State University conducted searches of the California Historical Resources Information System (CHRIS) and CSLC California Shipwreck and Historic Maritime Resources Program database[6] to determine if sensitive cultural or historic resources occur in the mining area that may be adversely affected by mining (NWIC 2018). These searches determined that no historic structures or shipwrecks exist within the underwater site. Review of historical literature and maps indicate the possibility of historic-period activity within the Project area.

The oyster shell deposits in the South Bay are considered a paleontological resource deposited approximately 2,300 to 2,500 years ago by native San Francisco Bay oysters. The area leased by the CSLC for oyster shell mining is limited to a relatively small region of the South Bay (see Figure 1-1) that contains an estimated 20 percent of the relic oyster shell present in South Bay deposits.

[6] http://www.slc.ca.gov/Info/Shipwrecks.html

3.5.2 Regulatory Setting

Federal and state laws and regulations pertaining to cultural and paleontological resources and relevant to the Project are identified in Appendix A. The Historic Resources Element of the San Mateo County General Plan (1986) discusses the importance of oyster and shrimp fishing and salt and cement manufacturing industries within and surrounding the southern portion of the San Francisco Bay during the early part of the 20th century.

3.5.3 Impact Analysis

a) Cause a substantial adverse change in the significance of a historical resource (as defined in State CEQA Guidelines, § 15064.5)?

b) Cause a substantial adverse change in the significance of an archaeological resource (pursuant to State CEQA Guidelines, § 15064.5)?

a) and b) Less than Significant with Mitigation. Results of the NWIC's 2005 records search found a low potential for Native American archeological resources, no historic-period shipwrecks, and no possibility of identifying historic-period archeological deposits (CSLC 2005). The NWIC (2018) review of historical literature and maps indicated a possibility of historic-period activity within the Project area. The historic-period oyster shell deposit located within the Project area should be considered refuse from these historic-period industries and is therefore an unrecorded historic-period archaeological resource. For this reason, there is a high sensitivity for unrecorded historic-period archaeological resources within the Project area. The 2018 records search also indicated no presence of any historic-period shipwrecks.

Given the potential for identifying historic-period archaeological and Native American cultural resources, implementation of **MM CUL-1** will provide sensitivity training for any cultural resources that may be encountered during mining operations that will describe the potential types of cultural resources and the need for their protection.

MM CUL-1: Mining Personnel Cultural Resource Sensitivity Training. The Applicant shall retain a certified archaeologist, defined as an archaeologist meeting the Secretary of the Interior's Standards for professional archaeology (U.S. Department of the Interior, 2011), to carry out this measure related to archaeological, tribal, historical, and paleontological resources.

- After lease approval and prior to the first mining episode, the archaeologist, in coordination with the CSLC and a California Native American tribe(s) that is culturally-affiliated to the Project site, shall prepare a Cultural Resources Sensitivity Training Guide for all personnel working on the barge. A copy of the Cultural Resources Sensitivity Training Guide shall be submitted to the

California State Lands Commission (CSLC) for approval. The Training Guide shall include an overview of potential cultural resources that could be encountered during mining activities to facilitate worker recognition, avoidance, and subsequent immediate notification to the archaeologist and culturally-affiliated Native American tribe(s) for further evaluation and action, as appropriate.

- Lind Tug and Barge (LTB) shall ensure all new personnel obtain Cultural Resources Sensitivity Training prior to mining activities.
- The Cultural Resources Sensitivity Training Guide shall be kept available on the barge for all personnel to review and be familiar with as necessary.
- In the event that cultural resources are discovered during mining activities, all mining shall be suspended until a certified archaeologist has evaluated the nature and significance of the discovery. LTB shall notify CSLC staff of all potential archaeological, paleontological, historic or cultural resources that may be discovered and evaluated by the archeologist. A treatment plan on handling potentially significant resources shall be developed by the archaeologist and submitted to CSLC staff for review and approval. Title to all abandoned shipwrecks, archaeological, paleontological, historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC.
- In the event that a discovery relates to a tribal cultural resource, the certified archaeologist shall immediately coordinate with the CSLC and culturally-affiliated Native American tribe(s) to evaluate the nature and extent of the discovery as well as its potential significance. The location of any such discoveries must be kept confidential and measures should be taken to ensure that the area is secured to minimize site disturbance and potential vandalism. Impacts to previously unknown significant Tribal cultural resources shall be avoided through preservation in place if feasible.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than Significant with Mitigation. The Applicant estimates the historic oyster shell deposit in the South Bay to exceed 60 million tons, with more reserves being discovered within other areas of the South Bay. The proposed level of LTB mining (limited to a maximum of 40,000 tons annually (see Table 2-3) represents a mining rate of approximately 0.3 percent per year of the estimated shell reserves within the lease area and approximately 0.07 percent per year of the estimated total South Bay shell reserves. Oyster shell mining in the South Bay has been permitted by the State Mining and Geology Board and BCDC and is conducted in accordance with an approved Surface Mining and Reclamation Act (SMARA) Reclamation Plan (see Section 3.12, *Mineral Resources*, and

Appendix D). **MM CUL-1** includes training to familiarize workers with the compliance measures pertaining to paleontological resources.

d) Disturb any human remains, including those interred outside of formal cemeteries?

Less than Significant with Mitigation. The Project area has been underwater for more than 2,500 years. The Project is not expected to impact human burials; however, in the unanticipated event that burials are encountered, they must be managed in accordance with state law. Implementation of **MM CUL-1** will require discussion of the possibility that previously unidentified human remains may become apparent and will ensure that workers are familiar with the compliance measures. In addition, to ensure that potential impacts to human remains are avoided or, if discovered, mitigated to less than significant, **MM CUL-2** would be implemented.

MM CUL-2 Unanticipated Discovery of Human Remains. If human remains are encountered, all provisions provided in California Health and Safety Code section 7050.5 and California Public Resources Code section 5097.98 shall be followed.

3.5.4 Mitigation Summary

Implementation of the following MMs would reduce the potential for Project-related impacts to cultural and paleontological resources to less than significant:

- MM CUL-1: Annual Crew Worker Cultural Sensitivity Training
- MM CUL-2: Unanticipated Discovery of Human Remains

3.6 CULTURAL RESOURCES – TRIBAL

TRIBAL CULTURAL RESOURCES – Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1, subdivision (k), or	☐	☒	☐	☐
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying the criteria set forth in Public Resources Code section 5024.1, subdivision (c), the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

3.6.1 Environmental Setting

This section reviews potential significant impacts to Tribal cultural resources in the Lind Tug and Barge Oyster Shell Mining project (Project) area. Information relevant to cultural and paleontological resources is provided in Section 3.5, *Cultural and Paleontological Resources.*

Oyster shell mining is restricted to an open-water subtidal area of the South Bay (Figure 1-1) that has been submerged for more than 2,500 years. At the time of Euroamerican contact, the Native Americans that lived in the general vicinity of the Project area were speakers of the Ramaytush and Chochenyo languages, part of the Costanoan subfamily of the Utian language family (Shipley 1978). As discussed in Section 3.5, *Cultural and Paleontological Resources*, records searches reported in CSLC (2005) and NWIC (2018) indicate that there is a low potential for Native American resources within or adjacent to the Project area. The ethnographic literature (Levy 1976) also did not identify any Native American resources within or adjacent to the Project area. No tribal settlements are known to have occurred in the mining area; however, Native American tribes may have used the South Bay for open-water fishing (NWIC 2018).

The Historic Resources Element of the San Mateo County General Plan (1986) discusses the importance of oyster and shrimp fishing and salt and cement manufacturing industries

within and surrounding the southern portion of the San Francisco Bay during the early part of the 20th century. The historic-period oyster shell deposit located within the Project area should be considered refuse from these historic-period industries and is therefore an unrecorded historic-period archaeological resource. For this reason, there is a high sensitivity for unrecorded historic-period archaeological resources within the Lind Tug and Barge Oyster Shell Mining project area (NWIC 2018). The NWIC recommended that local Native American tribe(s) be contacted regarding traditional, cultural, and religious heritage values.

Tribal Coordination

Pursuant to Executive Order B-10-11 concerning coordination with Tribal governments in public decision making (see Appendix A), the CSLC adopted a Tribal Consultation Policy in August 2016 to provide guidance and consistency in its interactions with California Native American Tribes (CSLC 2016). The Tribal Consultation Policy, which was developed in collaboration with Tribes, other State agencies and departments, and the Governor's Tribal Advisor, recognizes that Tribes have a connection to areas that may be affected by CSLC actions and "that these Tribes and their members have unique and valuable knowledge and practices for conserving and using these resources sustainably" (CSLC 2016).

The CSLC submitted a Native American Heritage Commission (NAHC) sacred lands file search in February 2018. The response indicated no known presence of Native American Tribal cultural resources in the immediate Project area. The NAHC also provided a Native American contact list the CSLC used for outreach and coordination. While no Tribes with geographical or cultural affiliation in San Mateo County have submitted written requests to the CSLC for notification of CEQA projects pursuant to AB 52, in February 2018 the CSLC staff contacted the Tribal Chairpersons identified by the NAHC to ensure the Tribes had an opportunity to provide meaningful input on the potential for Tribal cultural resources to be found in the Project area, and what steps should be taken to ensure adverse impacts to Tribal cultural resources are avoided. CSLC staff sent outreach letters in March 2018 to the following Tribes:

- Coastanoan Rumsen Carmel Tribe
- Amah Mutsun Tribal Band of Mission San Juan Bautista
- Muwekma Ohlone Indian Tribe of the SF Bay Area
- The Ohlone Indian Tribe
- Indian Canyon Mutsun Band of Costanoan

At the time the MND was released for public review, the CSLC had not received any responses to staff's outreach letters.

3.6.2 Regulatory Setting

Federal and state laws and regulations pertaining to Tribal cultural resources and relevant to the Project are identified in Appendix A. At the local government level, no goals, policies, or regulations are applicable to this issue area for the Project, due to its offshore location and the nature of the marine activity.

Tribal cultural resources, a new class of resources under AB 52, include sites, features, places, cultural landscapes, and sacred places or objects that have cultural value or significance to a Tribe. A Tribal cultural resource is one that is either: 1) listed on, or eligible for listing on the California Register of Historic Resources or local register of historical resources; or 2) a resource that the lead agency, at its discretion and supported by substantial evidence, determines is significant pursuant to the criteria in Public Resources Code section 5024.1, subdivision (c) (see Pub. Resources Code, § 21074). Because Tribes traditionally and culturally affiliated with a geographic area may have specific expertise concerning their Tribal cultural resources, AB 52 sets forth requirements for notification and invitation to government-to-government consultation between the CEQA lead agency and geographically affiliated Tribes (Pub. Resources Code, § 21083.1, subd (a)). Under AB 52, lead agencies must avoid damaging effects to Tribal cultural resources, when feasible, regardless of whether consultation occurred or is required.

3.6.3 Impact Analysis

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1, subdivision (k), or

b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in Public Resources Code Section 5024.1, subdivision (c). In applying the criteria set forth in Public Resources Code section 5024.1, subdivision (c), the lead agency shall consider the significance of the resource to a California Native American tribe.

a) and b) Less than Significant with Mitigation. A cultural resources records search was conducted in 2005 and again in 2018 for the oyster shell mining lease area, and as provided in the Environmental Setting above, there is a low potential for Native American resources within or adjacent to the Project area. A Sacred Lands File and Native

American Contacts List Request was submitted to the NAHC, with a negative result in the Sacred Lands File search. No impacts to Tribal cultural resources have been identified. Although there are no identified Tribal cultural resources present within the Project area, implementation of **MM CUL-1** and **MM CUL-2** (see Section 3.5, *Cultural and Paleontological Resources*) would address the possibility that previously unidentified Tribal cultural resources may become apparent and the procedures to follow if any resources are encountered.

MM CUL-1: Mining Personnel Cultural Resource Sensitivity Training. The Applicant shall retain a certified archaeologist, defined as an archaeologist meeting the Secretary of the Interior's Standards for professional archaeology (U.S. Department of the Interior, 2011), to carry out this measure related to archaeological, tribal, historical, and paleontological resources.

- After lease approval and prior to the first mining episode, the archaeologist, in coordination with the CSLC and a California Native American tribe(s) that is culturally-affiliated to the Project site, shall prepare a Cultural Resources Sensitivity Training Guide for all personnel working on the barge. A copy of the Cultural Resources Sensitivity Training Guide shall be submitted to the California State Lands Commission (CSLC) for approval. The Training Guide shall include an overview of potential cultural resources that could be encountered during mining activities to facilitate worker recognition, avoidance, and subsequent immediate notification to the archaeologist and culturally-affiliated Native American tribe(s) for further evaluation and action, as appropriate.
- Lind Tug and Barge (LTB) shall ensure all new personnel obtain Cultural Resources Sensitivity Training prior to mining activities.
- The Cultural Resources Sensitivity Training Guide shall be kept available on the barge for all personnel to review and be familiar with as necessary.
- In the event that cultural resources are discovered during mining activities, all mining shall be suspended until a certified archaeologist has evaluated the nature and significance of the discovery. LTB shall notify CSLC staff of all potential archaeological, paleontological, historic or cultural resources that may be discovered and evaluated by the archeologist. A treatment plan on handling potentially significant resources shall be developed by the archaeologist and submitted to CSLC staff for review and approval. Title to all abandoned shipwrecks, archaeological, paleontological, historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC.
- In the event that a discovery relates to a tribal cultural resource, the certified archaeologist shall immediately coordinate with the CSLC and culturally-affiliated Native American tribe(s) to evaluate the nature and extent of the discovery as well as its potential significance. The location of any such

discoveries must be kept confidential and measures should be taken to ensure that the area is secured to minimize site disturbance and potential vandalism. Impacts to previously unknown significant Tribal cultural resources shall be avoided through preservation in place if feasible.

- **MM CUL-2 Unanticipated Discovery of Human Remains**. If human remains are encountered, all provisions provided in California Health and Safety Code section 7050.5 and California Public Resources Code section 5097.98 shall be followed.

3.6.4 Mitigation Summary

No Tribal cultural resources have been identified for the Project area; however; implementation of the following mitigation measure would reduce any potential for Project-related impacts to Tribal cultural resources to less than significant:

- MM CUL-1: Annual Crew Worker Cultural Sensitivity Training
- MM CUL-2: Unanticipated Discovery of Human Remains

3.7 GEOLOGY AND SOILS

GEOLOGY AND SOILS – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

3.7.1 Environmental Setting

The proposed oyster shell mining site is located in an open-water subtidal area of the South Bay north of the San Mateo Bridge (Figure 1-1). Oyster shell has been commercially mined from the South Bay over the past 80 years; however, little quantitative information on the quantity of shells deposited in the South Bay is available (Hart 1978). Historic oyster shell deposits in the South Bay originated in the Late Quaternary (Holocene) period, approximately 2,300 to 2,500 years ago, when the native oyster (*Ostrea lurida*) population flourished within the South Bay. Most of the deposits lie in the upper part of a Holocene soft mud unit – referred to as “younger bay mud” by Treasher (1963) (cited in Hart 1978). The younger bay mud deposits, consisting mainly

of a silty clay mud with interbedded lenses of silt, sand, peat, and shells, are widely distributed in the South Bay. The shells exist as numerous thin lenses of varying purity that are largely concentrated in the upper 30 or 40 feet of the younger bay mud unit (Hart 1978). Test borings show that shell deposits up to 25 feet thick exist in several places in the South Bay. The most extensive shell horizons known lie east of the main shipping channel in the South Bay (Hart 1978). Due to wave and current action, these loose shell deposits migrate shoreward to form beaches in San Mateo County (Hart 1978).

The best available information on shell deposits was developed by Ideal Cement Company in 1962 as part of an exploratory program to estimate shell reserves. The survey included results from 107 drill and core samples within shell deposits in the South Bay. Results of these samples showed that the shell deposits near the San Mateo Bridge and elsewhere in the South Bay are extensive with oyster shell deposits 4 to 15 feet thick (Story et al. 1966 cited by Hart 1978). Using these data and results of surveys conducted by the U.S. Geological Survey (USGS) and others, and assuming that oyster shells were deposited over a 4-mile-long by 3-mile-wide area at an average thickness of 5 feet and average shell composition of 70 percent, Hart (1966) estimated the deposits to be 75 million tons. Current estimates of shell reserves are approximately 60 million tons. Holocene deposits cover most of the area within the Redwood Point Quadrangle which includes the proposed oyster shell mining lease area. Upland areas within the quadrangle and drier areas found along the shoreline are susceptible to liquefaction based on the Seismic Hazard Zone Map for this quadrangle. The CSLC lease area, which is submerged and saturated, is not subject to liquefaction.

3.7.2 Regulatory Setting

Federal and state laws and regulations pertaining to this issue area and relevant to the Project are identified in Appendix A. No local goals, policies, or regulations are applicable to this issue area for the Project, due to its location and the nature of the activity.

3.7.3 Impact Analysis

As a result of the subtidal deposits of oyster shell, the substrate is not characterized as an unstable area or with expansive soil. Qualitative observations as part of past (baseline) oyster shell mining and limited results of several bathymetric surveys in the South Bay and mining lease area show only limited changes in water depths in areas where mining has occurred. The South Bay is a relatively shallow area with large surface area that is subject to tidal conditions and wind-driven sediment movement and re-suspension. Deposition of sediment in depressions left from prior mining activity would contribute to a changes to the local bathymetry. LTB oyster shell mining in the South Bay is conducted under a State Mining and Geology Board SMARA Reclamation Plan (see Appendix E).

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: (i) Rupture of a known earthquake fault,

as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42; (ii) Strong seismic ground shaking; (iii) Seismic-related ground failure, including liquefaction?; or (iv) Landslides?

b) Result in substantial soil erosion or the loss of topsoil?

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse

a) – c) No Impact. The mining Project would temporarily disturb bottom substrate in the South Bay in the lease area (Figure 1-1). The Project site is not located within or adjacent to a delineated Alquist-Priolo Earthquake Fault Zone. The nearest faults are the San Andreas Fault (4 miles west) and Hayward Fault (6 miles east). While the Project is in a seismically active region, there is no risk to persons associated with the Project beyond that experienced daily by the public. Qualitative observations as part of past (baseline) oyster shell mining and results of bathymetric surveys in the South Bay and the CSLC lease area show limited changes in water depths in areas where mining has occurred.

The Applicant will implement **APM-3** by working collaboratively with BCDC and other interested parties to design and conduct periodic bathymetric surveys to monitor trends and changes in bathymetry within the oyster shell mining lease area. The Project site is located within an area susceptible to liquefaction with the occurrence of a large earthquake; however, the nature of the on-going mining of the Project, and lack of structures at the Project site, make potential risks negligible.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

d) and e) No Impact. Since the site is completely covered by water; no structures or wastewater disposal systems are on or near the site.

3.7.4 Mitigation Summary

No significant impacts to geology or soils would occur; however, the Applicant will implement **APM-3**.

- APM-3: Periodic Bathymetric Surveys.

3.8 GREENHOUSE GAS EMISSIONS

GREENHOUSE GAS EMISSIONS - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

This section evaluates the potential for the Project to generate direct or indirect greenhouse gas (GHG) emissions in the Project area. The section describes expected impacts associated with GHG emissions from Project activities, equipment and scheduling and evaluates the significance of those impacts relative to the existing setting. Potential air quality impacts are discussed in Section 3.3, *Air Quality*. The section begins with a discussion of GHG science and the existing GHG setting within the Project area.

3.8.1 Environmental Setting

GHGs are defined as any gas that absorbs infrared radiation in the atmosphere. GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride. These GHGs lead to the trapping and buildup of heat in the atmosphere near the earth's surface, commonly known as the greenhouse effect. There is overwhelming scientific consensus that human-related emissions of GHGs above natural levels have contributed significantly to global climate change by increasing the concentrations of the gases responsible for the greenhouse effect, which causes atmospheric warming above natural conditions.

According to the National Oceanic and Atmospheric Administration (NOAA), the atmospheric concentration CO_2 measured at Mauna Loa, Hawaii in May 2016 was 407.70 parts per million (ppm) (NOAA 2017) compared to pre-industrial levels of 280 ppm +/- 20 ppm (Intergovernmental Panel on Climate Change [IPCC] 2014). NOAA's Mauna Loa data also show that the mean annual CO_2 concentration growth rate is accelerating: in the 1960s it was about 0.9 ppm per year; in the first decade of the 2000s it was almost 2 ppm per year; and from May 2015 to May 2016 it was nearly 4 ppm annually. Because GHG emissions are known to increase atmospheric concentrations of GHGs, and increased GHG concentrations in the atmosphere exacerbate global warming, a project that adds to the atmospheric load of GHGs adds to the problem. To avoid disruptive and potentially catastrophic climate change, annual GHG emissions must not only stabilize but must be substantially reduced. The impact to climate change due to the increase in ambient concentrations of GHGs differ from criteria pollutants (see Section 3.3, *Air Quality*), in that GHG emissions from a specific project do not cause direct adverse

localized human health effects. Rather, the direct environmental effect of GHG emissions is the cumulative effect of an overall increase in global temperatures, which in turn has numerous indirect effects on the environment and humans.

The IPCC completed a Fifth Assessment Report (AR5) in 2014 that contains information on the state of scientific, technical, and socioeconomic knowledge about climate change. The AR5 includes working group reports on basics of the science, potential impacts and vulnerability, and mitigation strategies.[7] Global climate change has caused physical, social, and economic impacts in California, such as land surface and ocean warming, decreasing snow and ice, rising sea levels, increased frequency and intensity of droughts, storms, and floods, and increased rates of coastal erosion. In its Climate Change 2014 Synthesis Report, which is part of the AR5, the IPCC (2014) notes:

> *Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems…warming of the climate system is unequivocal, and, since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen.*

The potential of a gas or aerosol to trap heat in the atmosphere is called global warming potential (GWP). The GWP of different GHGs varies because they absorb different amounts of heat. CO_2, the most ubiquitous GHG, is used to relate the amount of heat absorbed to the amount of the gas emissions; this is referred to as CO_2 equivalent (CO_2e). CO_2e is the amount of GHG emitted multiplied by the GWP. The GWP of CO_2, as the reference GHG, is 1. Methane has a GWP of 25; therefore, 1 pound of methane equates to 25 pounds of CO_2e. Table 3.8-1 below shows a range of gases with their associated GWP, their estimated lifetime in the atmosphere, and the GWP over a 100-year timeframe (per federal and state reporting requirements).

Table 3.8-1. Global Warming Potential of Various Gases

Gas	Life in Atmosphere (years)	100-year GWP (average)
Carbon Dioxide	50-200	1
Methane	12	25
Nitrous Oxide	120	298
Hydrofluorocarbons	1.5-264	12-14,800
Sulfur hexafluoride	3,200	22,800

Source: U.S. Environmental Protection Agency (2017) 40 CFR Part 98, Subpart A, Table A-1. The 40 CFR Part 98 approach is used to estimate greenhouse gas (GHG) emissions per million British Thermal Units, assuming 99.9 percent combustion efficiency (Appendix D).
Acronyms: CFR = Code of Federal Regulations; GWP = global warming potential.

[7] For additional information on the Fifth Assessment Report, see https://www.ipcc.ch/report/ar5/.

3.8.1.1 Context for Emission Inventories and Projections

In 2012, estimated global and California emissions were 53,937 million metric tons of CO2e (MMTCO2e) and 6,525 MMTCO2e, respectively (European Commission 2016; U.S. Environmental Protection Agency [USEPA] 2014). In California, the California Air Resources Board (CARB) is the primary agency responsible for providing information on implementing the GHG reductions required by Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, and its 2016 update, Senate Bill (SB) 32. Together, these laws require CARB to develop regulations that reduce GHG emissions to 1990 levels by 2020 and to 40 percent below 1990 levels by 2030. CARB developed and approved its first Scoping Plan, describing its approach to meeting the AB 32 goal, in 2008 (CARB 2014a). With enactment of SB 32, CARB (2017b) prepared a 2017 Climate Change Scoping Plan Update. In addition to the Scoping Plan, CARB maintains an online inventory of GHG emissions in California. The most recent inventory, released June 6, 2017, includes emissions from 2000 to 2015. This inventory is an important companion to the Scoping Plan because it documents the historical emission trends and progress toward meeting the 2020 and 2030 targets, which are 431 MMTCO2e and 260 MMTCO2e, respectively.

To monitor progress in emissions reduction, the Scoping Plan includes a modeled reference scenario, or "business as usual" projection that estimates future emissions based on current emissions, expected regulatory implementation, and other technological, social, economic, and behavioral patterns. The 2030 business as usual reference scenario was modeled for the 2017 Scoping Plan Update, representing forecasted state GHG emissions with existing policies and programs but without additional action beyond that to reduce GHGs. This modeling shows that the California is expected to achieve the 2020 target of 431 $MMTCO_2e$ but that a significant increase in the rate of GHG reductions is needed to meet the 2030 and 2050 targets (CARB 2017a).

3.8.1.2 National

The primary source of GHG in the U.S. is energy-use related activities, which include fuel combustion and energy production, transmission, storage, and distribution. Energy related activities generated 84 percent of the total U.S. emissions in 2012. Fossil fuel combustion represents the majority of energy-related GHG emissions with CO_2 being the primary GHG. The U.S., which has about 4.4 percent of the global population, emits roughly 12 percent of all global GHG emissions.

3.8.1.3 State

California, which has approximately 0.51 percent of the global population, emits less than 0.85 percent of the total global GHG emissions, which is approximately 40 percent lower per capita than the overall U.S. average. Despite growing population and gross domestic product, gross GHG emissions continue to decrease, as do emissions per capita (per capita emissions have dropped from 14 tons to 11.4 tons), exhibiting a major decline in

the "carbon intensity" of California's overall economy. The transportation sector remains responsible for the largest share of GHG emissions in the 2016 Inventory, accounting for approximately 36 percent of the total. While transportation and electric power sector emissions are decreasing year to year, other sectors have been flat or rising slightly (CARB 2016a). Since its 2004 peak, California has reduced its total annual emissions by 9.4 percent; transportation sector emissions are 13 percent lower.

Even though California is aggressively moving to reduce its annual GHG emissions, the state is already experiencing the effects of GHG-related climate change, which is a relevant aspect of the environmental setting. A 2013 report entitled *Indicators of Climate Change in California* (Office of Environmental Health Hazard Assessment [OEHHA] 2013) concludes that the changes occurring in California are largely consistent with those observed globally. These climate change indicators show the following.

- Annual average temperatures in California are on the rise, including increases in daily minimum and maximum temperatures.
- Extreme events, including wildfire and heat waves, are more frequent.
- Spring runoff volumes are declining as a result of a diminished snowpack.
- The number of "winter chill hours" crucial for the production of high-value fruit and nut crops, are declining.
- Species are on the move, showing up at different times and locations than previously recorded, including both flora and fauna at higher elevations.

3.8.2 Regulatory Setting

Federal and state laws and regulations pertaining to GHG emissions and relevant to the Project are identified in Appendix A. At the regional level, in 2017, the Bay Area Air Quality Management District (BAAQMD) adopted GHG thresholds in effort to meet the GHG reduction goals of AB 32 (BAAQMD 2017). Thresholds for land use development projects include:

- Compliance with a qualified GHG Reduction Strategy
- Annual emissions less than 1,100 $MTCO_2e$/year
- Land use development projects include residential, commercial, industrial, and public land uses and facilities
- Efficiency Threshold of 4.6 $MTCO_2e$/Service Population (residents + employees)/year

Emissions from construction-only projects (e.g., roadways, pipelines, etc.) would be amortized over the life of the Project and compared to an adopted GHG Reduction Strategy. Over time, implementation of AB 32 through the newly implemented BAAQMD

GHG thresholds would mitigate and reduce GHG emissions from land use development projects. If annual emissions of operational-related GHGs exceed these levels, the Project would result in a cumulatively considerable contribution of GHG emissions and a cumulatively significant impact to global climate change. The existing and future use of processed oyster shell has not changed from the established baseline conditions. Identifying and determining the exact end use of mined oyster shell and emission comparisons from uses of oyster shell is speculative and subject to change depending on the end use of the oyster shell, the CO_2 emissions from different uses of oyster shell, and the varying sources consuming these products. The actual amount of oyster shells mined and produced is dependent on the current consumer demand and consumption for oyster shell; however, it is too speculative at this time to conclude the Project would have any overall net changes in GHG emissions from the end use of oyster shell uses and products. The CSLC has no control over the ultimate end use of the oyster shell and no authority to regulate GHG emissions from the use of such products.

3.8.3 Impact Analysis

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less than Significant Impact. Recent data (see Section 2.4.2, *Temporal Distribution and Duration of Mining Episodes*) show that the projected level of mining associated with the proposed Project using its new configuration would be approximately 22 mining events per year with a total mining duration estimated to be 554 hours per year or 6.3 percent of the time annually. Mining events are periodic and intermittent and therefore potential environmental effects to GHG and air emissions are temporary and of short-duration (each mining event lasts only a matter of hours).

The oyster shell mining project results in air emissions from several sources of marine equipment, including the tugboat, and diesel engines used to power the generator and pumping equipment on the shell barge. A listing of engines used on the equipment is summarized in Table 2-1. The tug typically used to transport the mining barge to and from the offloading sites was re-powered under a Carl Moyer/CARB Grant in 2013 with updated diesel engines that meet or exceed Tier 3 air quality and GHG emission standards, ahead of the CARB commercial harbor craft engine replacement schedule, thus reducing air emissions when compared to the environmental baseline conditions. All of Lind Marine's tugboats that would be potentially used to transport the mining equipment are within or ahead of the CARB commercial harbor craft engine replacement schedule.

The barge *South Bay* historically used during oyster shell mining was recently replaced by a new main barge for mining operations. The new barge has a larger storage capacity and greater mining efficiency which would reduce the future frequency and duration of mining events, resulting in a corresponding reduction in air emissions associated with oyster shell mining. The mining barge has also recently been modified to include electric

motors with no air emissions on all mining equipment. The electric motors are powered by a Tier 4 diesel generator. A diesel change-out (**APM-1** and **APM-2**) will further reduce GHG emissions compared to when all mining equipment was diesel powered. No chemicals are used in the shell washing process that would contribute to GHG emissions. Since the oyster shell is wet, no dust is emitted.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less than Significant Impact. The baseline for the GHG emissions analysis is the level of emissions associated with the average annual level of mining activity that occurred in 2014, the year before LTB submitted its application for a new lease for oyster shell mining. These emissions have been quantified and are presented in Table 3.8-2 below. The diesel engines on the tug and barge configuration complied with CARB regulations when the new lease application process began.

Table 3.8-2. Annual Greenhouse Gas Emissions for Mining Operations

Scenario	Year	Average Annual Tonnage	Annual Metric Tons			
			CO_2	CH_4	N_2O	CO_2e
Baseline	2013	1,209,506	461	0.06	0.01	465
Final	2018	833,645	339	0.01	0.01	341

Acronyms: CH_4 = methane; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; N_2O = nitrous oxide.

The proposed oyster shell mining in the South Bay does not involve or require any construction. BAAQMD staff routinely monitors GHGs and other air emissions during mining events and processing operations. All mining equipment used by the Applicant meets or exceeds current BAAQMD air quality emission standards. The Applicant has employed APMs to reduce the potential significant effects on GHG emissions. Detailed calculations are presented in Appendix F.

3.8.4 Mitigation Summary

The Project would not result in significant GHG emissions; however, implementation of **APM-1** and **APM-2** would further reduce emissions.

- APM-1 Replacement of Tier-0 and Tier-1 Pump Engines with Electric Motors
- APM-2 Electrification of the Mining Pumps with a Tier-4 Diesel Generator

3.9 HAZARDS AND HAZARDOUS MATERIALS

HAZARDS AND HAZARDOUS MATERIALS – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

3.9.1 Environmental Setting

LTB shell mining activity is restricted to the CSLC lease area located in an open-water subtidal region of the South Bay. The CSLC lease (Figure 1-1) is located more than 3 miles from the shoreline, residences, or businesses. No infrastructure occurs within the mining lease.

3.9.2 Regulatory Setting

Federal and state laws and regulations pertaining to this issue area and relevant to the Project are identified in Appendix A. At the local government level, no goals, policies, or regulations are applicable to this issue area for the Project, due to its offshore location and the nature of the mining activity.

3.9.3 Impact Analysis

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less than Significant with Mitigation The oyster shell deposits and surrounding bay mud are natural materials and no toxic hazardous chemicals have been identified from the mining area. No toxic chemicals are used in either washing or processing the oyster shells. With implementation of **MM BIO-1** (see Section 3.4, *Biological Resources*), water used for washing the shell is returned underwater at the South Bay mining site to reduce surface turbulence and to rapidly dissipate the overflow and wash water discharge to reduce surface plume visibility and suspended sediment concentrations. No chemicals are added to the wash water or used in onboard shell washing and, therefore, nothing is added to the wash water that did not originate at the mining site.

Hazardous materials associated with oyster shell mining activities include diesel fuel for tug boat and barge engines and generators, lubricants and coolants for the engines and dredge equipment, hydraulic fluid for some dredge equipment, and minor amounts of other materials such as paint, detergents, and welding gases. The Applicant has not experienced an accidental spill resulting in a pollutant discharge to the South Bay during oyster shell mining over the past several decades of mining activity. Crews manning the dredge and tug boat are experienced employees and are trained in accidental spill prevention, containment, and response (including agency notification) in the unlikely event of an accidental spill and discharge to the South Bay during a mining event. The Applicant's shell mining barge is not large enough to require a California Non-Tank Vessel Contingency Plan (CANTVCP) from the California Department of Fish and Wildlife Office of Spill Prevention and Response (CDFW OSPR), which applies to vessels larger than 300 gross tons. However, LTB maintains a contract with an approved Oil Spill Response Organization, a requirement of the CANTVCP program, and pollution and liability insurance covering potential spills.

Licensed and accredited fuel jobbers approved by both CDFW and the U.S. Coast Guard (USCG) conduct all the marine fueling of the equipment and tugboats while the equipment

is docked at one of the offload sites or at LTB's maintenance facility at Mare Island; no fueling is conducted at the mining site. The jobber handles all aspects of refueling including flag boats, oil booms and warning signals. The fueling is conducted under the supervision of the jobber and at least five persons are standing watch during the fueling.

Marine contractors at their permitted facilities accomplish all major maintenance. Personnel trained in the care of marine equipment conduct minor and routine maintenance at the Applicant's offloading facilities.

Oyster shell mining by the Applicant includes crew training and compliance with a written Spill Response Field Guide Emergency Procedures Response Action Checklist (see Appendix B) designed to reduce and avoid the risk of hazardous spills. This spill response plan provides specific measures to prevent and control hazardous materials spills and training for personnel. The Applicant proposes to implement the Spill Response Field Guide Emergency Procedures Response Action Checklist to ensure the crew contains any accidental discharge onsite. Even with these measures, the impact of a spill could be significant. Therefore, **MM HAZ-1** will ensure that procedures to ensure containment and cleanup equipment is available to the tugboat and mining crew.

MM HAZ-1: Hazardous Material Control and Spill Prevention and Response Plan. The Spill Response Field Guide Emergency Procedures Response Action Checklist shall be implemented to ensure any accidental discharge is contained by the crew at the site. The dredge and tug crews shall be trained in accidental spill prevention, containment and response (including Agency notification) in the unlikely event of an accidental spill and discharge to the South Bay during a mining event. The dredge and tug boat crews will have access to cleanup equipment at all times.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. The project area is subtidal, with no schools within 3 miles.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. The project is subtidal and has not been included on a list of hazardous materials sites.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

f) For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area?

e) and f) No Impact. The project is subtidal and not within the vicinity of a public airport, public use airport or private airstrip.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. The project is subtidal and would not interfere with any emergency response plans.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

No Impact. The project is subtidal and not subject to wildland fires.

3.9.4 Mitigation Summary

Implementation of the following MMs would reduce the potential for Project-related impacts from hazardous materials to less than significant.

- MM BIO-1: Turbidity Reduction During Mining
- MM HAZ-1: Hazardous Material Control and Spill Prevention and Response Plan

3.10 HYDROLOGY AND WATER QUALITY

HYDROLOGY AND WATER QUALITY – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

3.10.1 Environmental Setting

The proposed oyster shell mining site is located in an open-water subtidal area of the South Bay, north of the San Mateo Bridge (Figure 1-1). Oyster shell mining in the South Bay occurs in an area of the estuary characterized by naturally occurring high-suspended

sediment concentrations (background/ambient suspended sediments and turbidity) resulting from a combination of the shallow water depths, fine-grained sediments (silts and mud), and high wind, waves, and tidal currents that re-suspend sediments within the water column.

3.10.2 Regulatory Setting

Federal and state laws and regulations pertaining to this issue area and relevant to the Project are identified in Appendix A. At the local government level, no goals, policies, or regulations are applicable to this issue area for the Project, due to its offshore location and the nature of the mining activity.

The Applicant operates under a general water quality permit and self-monitoring program administered by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) and is in compliance with the SFBRWQCB permit requirements. As discussed in further detail below, a water quality survey was conducted in 1996 to characterize the effects of oyster shell mining on receiving water quality within the South Bay in the near-field area surrounding the shell mining equipment during actual mining events. Water quality monitoring data during oyster shell mining are presented in Table 3.10-1 below.

3.10.3 Impact Analysis

a) Violate any water quality standards or waste discharge requirements?

Less than Significant Impact. During oyster shell mining, excess water, including wash water, is discharged overboard through a pipe extending through the bottom of the barge to a depth of approximately 6 feet underwater. The discharge water contains suspended sediments, including silt and muds that contribute to a suspended sediment plume within the localized area when and where mining is occurring.

On March 28, 1996, Environmental Technical Services conducted a water quality survey on behalf of LTB. The purpose of the survey was to characterize the effects of oyster shell mining on receiving water quality within the South Bay in the immediate (near-field) area surrounding the South Bay and mining dredge and barge during a mining event. (The barge *South Bay* has since been replaced by a new mining barge which is equipped with a subsurface discharge pipe.) Standard methods for the examination of water and wastewater required by the SFBRWQCB were used in the survey. Water quality parameters included pH, dissolved oxygen, turbidity, color, total sulfides, and dissolved sulfides. Water samples were collected at four locations: 1,000 feet up current (ambient reference station) from the oyster shell mining barge, to characterize ambient background conditions; 5.0 feet down current of the barge effluent discharge source; 100 feet down current from the barge; and 500 feet down current of the barge. Results of the water quality survey are presented in Table 3.10-1.

Table 3.10-1. Water Quality Survey Results during Oyster Shell Mining

Sampled	Water Source	pH-log[H+]	Dissolved Oxygen (ppm)	Turbidity (NTU)	Apparent Color (CU)	Total Sulfides (ppm)	Dissolved Sulfides (ppm)
Sample 1	Reference Station	8.4	8.6	64	403	0.051	<0.001
Sample 2	50 feet down current	8.3	9.8	47	294	0.034	<0.001
Sample 3	100 feet down current	8.5	9.3	45	286	0.034	<0.001
Sample 4	500 feet down current	8.5	9.4	47	303	0.27	<0.001

Source: Environmental Technical Services (1996)

Results of this survey indicated that water quality conditions within the receiving waters down current of the shell mining barge were similar to the up current reference site. These results are consistent with visual observations by operators during shell mining noting the high ambient turbidity in the area and little or no distinction between the appearance of the discharge and receiving waters and with the results of water quality monitoring conducted by LTB to assess water quality constituents within the wash water prior to discharge. Additional water quality sampling was conducted to determine if oyster shell mining in the South Bay was mobilizing and re-suspending heavy metals or other contaminants. Results of this monitoring did not show evidence of elevated contaminant concentrations within the shell wash water and the requirement for water quality monitoring during oyster shell mining was removed by the SFBRWQCB.

No recent studies or other detailed field investigations have been conducted to characterize the discharge plume from the new mining equipment. To address this, LTB will conduct a plume study in consultation with the SFBRWQCB within the first 2 years of renewed permits as part of the Project **(APM-5)**. The study will provide information for future regulatory oversight and management of the resources and any potential effect oyster shell mining will have on the water quality of the surrounding area. Results of the plume study will be provided to the State and federal permitting agencies as part of permit compliance.

APM-5: Water Quality Wash Water Plume Study within First 2 Years of New Permits. The Applicant will collaborate with the San Francisco Bay Regional Water Quality Control Board and other interested agencies to design, fund, conduct, and report results of a discharge plume water quality monitoring study as part of the Project within 2 years after execution of a new lease.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-

existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

b) – e) No Impact. The proposed oyster shell mining site is located in an open-water subtidal area of the South Bay, north of the San Mateo Bridge (Figure 1-1). The Project does not make use of groundwater, alter existing drainage patterns or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.

f) Otherwise substantially degrade water quality?

Less than Significant Impact. A discussion of impacts to fish and macroinvertebrates caused by suspended solids is included in Section 3.4, *Biological Resources*. An extensive body of scientific information is available on the effects of exposure for various species and life stages of fish and macroinvertebrates to suspended sediment concentrations. Although specific data are not available for all species occurring within the South Bay, the data available from the scientific literature, including tests and studies done on species from the Bay-Delta Estuary, have shown that species vary substantially in their sensitivity to suspended sediment exposure. Many of the species that have been tested, which are characterized by a sedentary epibenthic habitat preference (e.g., bay shrimp, crab, flatfish such as sole, flounder and halibut, and species similar to white croaker, plainfin midshipmen, and staghorn sculpin, among others) characteristically are tolerant of high suspended sediment concentrations. Other fish species, characteristic of the pelagic species, such as northern anchovy and adult and juvenile Pacific herring, exhibit a lower tolerance to suspended sediments. Many of these more sensitive pelagic species inhabit coastal waters where background suspended sediment concentrations are typically low. These more sensitive species move extensively throughout San Francisco Bay and nearshore coastal waters and, it has been hypothesized based on the available scientific literature, that they would behaviorally avoid areas having elevated suspended sediment concentrations. Fish and macroinvertebrates inhabiting South Bay where ambient concentrations of suspended sediments are characteristically high, would be expected to be more tolerant of suspended sediments when compared to the more

sensitive pelagic species inhabiting nearshore coastal waters and Central Bay. Based on analyses of the available scientific data, to date, a conservative behavioral response threshold (e.g., behavioral avoidance) may occur at suspended sediment concentrations of approximately 50 mg/l.

Data from available scientific literature document various biological responses of fish and macroinvertebrates to suspended sediment. Biological responses include sublethal effects such as epithelial and gill tissue abrasion, increased coughing response, changes in blood chemistry and other physiological responses, reduced foraging activity and prey capture ability, behavioral avoidance response, and other sublethal effects. The biological significance of these sublethal exposures on the overall health, growth rate, or survival of fish and macroinvertebrates continues to be evaluated. As concentrations of suspended sediments increase, or the duration of exposure increases, lethal effects (mortality) have been observed. Suspended sediment concentrations and durations of exposure resulting in lethal effects have been found to vary substantially among species and life stages. To date the evaluation of available information has not identified significant impacts to South Bay species associated with suspended sediment levels found in the South Bay.

For purposes of developing a worst-case impact analysis the oyster shell mining analysis assumed that the maximum potential duration for exposure to a discharge plume would be 18 hours (assuming a 12-hour mining event and 6-hour residual plume dissipation period). Results of the potential impact analysis assumed this worst-case duration of exposure to a 50 mg/1 suspended sediment concentration (based on results of sand mining plume studies) and 150 mg/1 based on results of the oyster shell mining investigation conducted on the James River estuary (Friedrichs and Battisto 2001).

Results of analyses performed have not detected potential adverse impacts (lethal effects) associated with increased suspended sediments within the discharge plume under either assumed condition for either Chinook salmon or longfin smelt. The results of these analyses have shown, however, that there is a potential for short-term localized changes in the geographic distribution for Chinook salmon and longfin smelt as a result of behavioral avoidance of the discharge plume. These changes in species distribution would be limited to the immediate vicinity of the discharge plume if suspended sediment concentrations exceed thresholds for behavioral response. At the completion of a mining event, and dissipation of the discharge plume, salmon and smelt would be expected to redistribute themselves within the mining area depending on ambient conditions. These temporary, localized changes in distribution of salmon and smelt have not been identified as a significant adverse impact of oyster shell mining and would not be expected to alter prey capture for predatory species such as striped bass, to an extent that would degrade the health or condition of either the predator or prey species inhabiting the area. Based on their occurrence in the South Bay where natural turbidity levels are frequently high, would be tolerant of the suspended sediment levels that occur in the mining plume (Table 3.10-1).

Since the potential area of the South Bay affected by the localized temporary discharge plume is small in comparison to the water body, migratory fish such as Chinook salmon or longfin smelt would have the opportunity to behaviorally avoid potentially stressful or unsuitable suspended sediment conditions resulting from the discharge plume. Therefore, no significant barrier or impediment to migration of either adults or juveniles is expected to occur in the South Bay as a result of oyster shell mining. The suspended sediment in the oyster shell mining plume, therefore, is not expected to result in adverse effects to species such as Chinook salmon, steelhead, or longfin smelt.

It was hypothesized that oyster shell mining may result in re-suspension of anoxic sediments and organic material resulting in depressed dissolved oxygen concentrations within the discharge plume associated with oyster shell mining activity. Results of water quality sampling within the near-field receiving waters of the South Bay during oyster shell mining (Table 3.10-1) showed no depression in dissolved oxygen concentrations. Results of these studies showed that dissolved oxygen concentrations were similar inside and outside of the discharge plume (Table 3.10-1). None of the dissolved oxygen concentrations measured during the oyster shell mining discharge plume water quality study were below the threshold (6 mg/1) where potentially adverse impacts to Chinook salmon, longfin smelt, or other fish and macroinvertebrates may occur. Results of the 1996 field studies provide no evidence to suggest that oyster shell mining activity in the South Bay resulted in depressed dissolved oxygen concentrations or adverse impacts to Chinook salmon or longfin smelt, or other fish inhabiting the area. Results of available water quality monitoring (Table 3.10-1) support a conclusion that oyster shell mining in the South Bay would not result in a depression in dissolved oxygen concentrations to a level that would result in significant adverse effects to aquatic resources.

Contaminants and Toxicity Within the Discharge Plume

Oyster shell mining creates a temporary and localized overflow plume. There is concern that exposure to contaminants within the overflow plume could affect the health of South Bay fish species due to exposure to increased levels of contaminants re-suspended with the fine sediments contained in the overflow effluent. The possibility that oyster shell mining could result in re-suspension of contaminant chemicals and increased exposure of fish and macroinvertebrates to potentially toxic materials was assessed in 1996. Results of water quality analyses from the discharge water during oyster shell mining in the South Bay (Table 3.10-1) provided no evidence that contaminant concentrations were within a range that would result in toxicity to fish or macroinvertebrates. Oyster shell mining occurs in an open-water subtidal region of the South Bay that is remote from point source discharges or other concentrated sources of potential contaminants. The available water quality data provide no evidence that oyster shell mining activity would result in an increased exposure and risk of adverse impacts to fish and macroinvertebrates from contaminant re-suspension.

The data available on effects of South Bay oyster shell mining on water quality are limited to one discharge plume study conducted in 1996. Since that study was completed, LTB has replaced the barge *South Bay* with a new shell mining barge and advances in water quality monitoring techniques have occurred. As part of the Project description, the project Applicant will fund a discharge plume water quality monitoring study designed in collaboration with SFBRWQCB staff and other interested agencies (**APM-5**)**.** The Project would not result in significant impacts to South Bay; no mitigation is required. However, the applicant has agreed to collaborate with SFBRWQCB and other interested agencies to design, fund, conduct, and report results of a discharge plume water quality monitoring study as part of the Project.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

j) Inundation by seiche, tsunami, or mudflow?

g) – j). No Impact. The Project is located in an open-water subtidal area of the South Bay, north of the San Mateo Bridge. The project does not involve the development of any new structures; therefore, would not alter the flow of floodwaters.

No long-term structures would be constructed as part of the Project. In the event of a tsunami warning, LTB would cease mining operations and move to safe harbor

3.10.4 Mitigation Summary

Implementation of the MMs identified in Section 3.4, *Biological Resources*, and APM-5 would further reduce the potential for Project-related impacts to hydrology/water quality to less than significant:

- MM BIO-1 Turbidity Reduction During Mining
- MM BIO-2 Limited Volume per Year
- MM BIO-3 Limit Pumping Depths
- MM BIO-6 Limited Mining (Lease) Areas
- APM-5 Water Quality Wash Water Plume Study within First 2 Years of New Permits

3.11 LAND USE AND PLANNING

LAND USE AND PLANNING – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

3.11.1 Environmental Setting

The Project would occur in an area of open-water in the South Bay with no infrastructure to serve housing or development. No housing is within the Project area.

3.11.2 Regulatory Setting

Federal and state laws and regulations pertaining to this issue area and relevant to the Project are identified in Appendix A. Of note, BCDC Findings and Policies Concerning Shell Deposits in the Bay identified in the San Francisco Bay Plan (BCDC 1969, reprinted 2012, p. 25) are:

a. Oyster shells are dredged from the Bay floor primarily for use as lime in the production of cement. A small portion of the shells are used as soil conditioner, as cattle feed, and as poultry grit by local poultry and egg producers.

b. The shell deposits are an important mineral resource because the other principal source of lime, limestone, is more distantly located in Santa Clara, Santa Cruz, and San Benito Counties to the south. Cement is expensive to transport over great distances, so a nearby source of lime is important to the Bay Area economy.

BCDC has permitted current and past oyster shell mining activity by Lind Tug and Barge, Inc. Oyster shell mining activity will be similar to, or less than, the level of activity that occurred under the environmental baseline conditions. Oyster shell mining from the South Bay requires approval and permitting from BCDC. Onshore offloading and processing of mined oyster shell would continue to occur at existing permitted industrial facilities in Petaluma or Collinsville. Although these facilities are not within the proposed Project scope (see Section 1.5, *Proposed Background, Objectives, and Scope*), local land use permits for the Petaluma and Collinsville facilities are identified below.

- The Petaluma facility operates in a zoned area designated as a "River Dependent Business License" (No. 0400596). Offshore structures are covered under California State Lands Commission Lease No. PRC 6695.1.
- The Collinsville facility is zoned as Industrial Water Dependent, and it operates under Solano County Conditional Use Permit No. U-83-4B and under BCDC Permit No. 1998.014.05md.

3.11.3 Impact Analysis

a) Physically divide an established community?

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

a) – c). No Impact. The Project is located in an open-water, subtidal region of the South Bay. It will not adversely affect existing land uses, physically divide an established community or conflict with any existing land use plan or conservation plan.

3.11.4 Mitigation Summary

The Project would not result in impacts to land use and planning in the South Bay; therefore, no mitigation is required.

3.12 MINERAL RESOURCES

MINERAL RESOURCES – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?	☐	☐	☒	☐
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☒	☐

3.12.1 Environmental Setting

Lind Tug and Barge, Inc. (LTB) commercially mines historic oyster shell deposits from subtidal areas located within the South Bay. Oyster shell mining occurs only within the CSLC designated lease area PRC 5534.1, located in the South Bay adjacent to the San Mateo Bridge (Figure 1-1) and has been identified by the BCDC as a commercially beneficial activity occurring within the subtidal areas of the South Bay. LTB, the only company currently mining oyster shell from the South Bay, has applied for a new CSLC lease and approval to continue oyster shell mining within the same area and using the same methods as in the past.

Hart (1978) estimates that 25 to 30 million tons of shell were mined from the South Bay between 1924 and the mid-1960s, the majority of which was used in the manufacture of cement (by others, not LTB). Most of the shells used were mined from the area around the San Mateo Bridge east of the main ship channel. Oyster shell mining has also been recorded, to a limited extent, south of the Dumbarton Bridge, and bottom depth changes recorded in nautical charts of different years indicate that additional mining occurred historically near the Oakland Airport, south of Alameda (Hart 1978).

CSLC lease area PRC 5534.1 (Figure 1-1) has an area approximately 2.4 square miles. Assuming that the average shell deposit is 5 feet thick with a 70 percent shell composition the estimated reserves within the lease area (currently 12 million tons) would be approximately 20 percent of the total South Bay reserve. Results of core sampling within the area adjacent to the San Mateo Bridge in the general vicinity of the lease area showed shell deposits 4 to 15 feet thick. Assuming that the shell deposits within the lease area average 10 feet thick, the estimated shell reserve within the lease is 24 million tons.

3.12.2 Regulatory Setting

Federal and state laws and regulations pertaining to this issue area and relevant to the Project are identified in Appendix A. At the local government level, no goals, policies, or

regulations are applicable to this issue area for the Project, due to its location and the nature of the activity.

3.12.3 Impact Analysis

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?

b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

Less than Significant Impact: The Applicant indicates that the historic oyster shell deposit in the South Bay may exceed 60 million tons, with more reserves being discovered within other areas of the South Bay. The proposed level of LTB mining (assumed to be 40,000 tons per year maximum [see Table 2-3] represents a mining rate of approximately 0.3 percent per year of the estimated shell reserves within the lease area and approximately 0.07 percent per year of the estimated total South Bay shell reserves. Oyster shell mining in the South Bay has been permitted by the State Mining and Geology Board and is conducted in accordance with an approved SMARA Reclamation Plan (see Appendix D). Oyster shell mining from the South Bay has been identified by BCDC as a commercially beneficial activity occurring within the South Bay.

Qualitative observations as part of past (baseline) oyster shell mining, as well as limited results of several bathymetric surveys in the South Bay and the mining lease area (see Appendix C), have shown only limited changes in water depths in those areas where mining has occurred. Given the limited availability of quantitative bathymetric surveys the applicant has voluntarily agreed to work collaboratively with CSLC, BCDC and other interested agencies in designing and conducting periodic bathymetric surveys to monitor trends and changes in bathymetry within the oyster shell mining lease area **(APM-3)**.

3.12.4 Mitigation Summary

The Project would not result in significant impacts to mineral resources in the South Bay. Implementation of the following APM will aid in monitoring trends and changes in bathymetry within the lease area:

- APM-3: Periodic Bathymetric Surveys.

3.13 NOISE

NOISE – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Result in exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?	☐	☐	☒	☐
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.13.1 Environmental Setting

This section discusses impacts of Project-generated noise on humans. Noise impacts to biological resources are discussed in Section 3.4, *Biological Resources*.

Sound is the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as an unwanted or objectionable sound. Noise can cause annoyance, interference with communication, sleep disturbance, or in severe cases, hearing impairment. Noise level (or volume) is generally measured in decibels (dB) using the A-weighted SPL (dBA). The A-weighted scale adjusts the actual sound power levels in order to be consistent with human hearing response, since the human ear is not equally sensitive to sound at all frequencies.

The SPL is measured on a logarithmic scale with the 0-dB level based on the lowest detectable SPL that people can perceive. Based on the logarithmic scale, a doubling of sound intensity is equivalent to an increase in 3 dB, and a sound that is 10 dB less than the ambient sound level has no effect on the ambient noise. In terms of human response

to noise, a sound 10 dBA higher than another is judged to be twice as loud. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud).

Human response to noise is dependent not only on the magnitude but also on the characteristic of the sound, including the sound frequency distribution. Generally, the human ear is more susceptible to higher frequency sounds than lower frequency sounds. Human response to noise is also dependent on the time of day and expectations based on location and other factors. For example, a person sleeping at home might react differently to the sound of a car horn than to the same sound while driving during the day. The regulatory process has attempted to account for these factors by developing noise metrics such as Community Noise Equivalent Level (CNEL) and the Day-Night Average Noise Level (L_{dn}) which incorporate penalties for noise events occurring at night. The L_{dn} rating is an average of noise over a 24-hour period in which noises occurring between 10 p.m. and 7 a.m. are increased by 10 dBA. The CNEL is similar but also adds a weighting of 5 dBA to noise events that occur between 7 p.m. and 10 p.m. Table 3.13-2 is a scale showing typical noise levels encountered in common daily activities.

Table 3.13-1. Common Sound Levels/Sources and Subjective Human Responses

Sound Level (dBA)	Typical Outdoor Noise Source	Typical Indoor Noise Sources	Typical Human Response/Effects
140	Carrier Jet takeoff (50 feet)	--	--Threshold for Pain--
130	Siren (100 feet) Live Rock Band	--	---Hearing Damage---
120	Jet takeoff (200 feet) Auto horn (3 feet)	--	--
110	Chain Saw Snow Mobile	--	---Deafening---
100	Lawn Mower (3 feet) Motorcycle (50 feet)	--	--
90	Heavy Duty Truck (50 feet)	Food Blender (3 feet)	---Very Loud---
80	Busy Urban Street, Daytime	Garbage Disposal (3 feet)	
70	Automobile (50 feet)	Vacuum Cleaner (9 feet)	---Loud---
60	Small plane at ¾ mi	Conversation (3 feet)	
50	Quiet Residential Daytime	Dishwasher Rinse (10 feet)	---Moderate---
40	Quiet Residential Nighttime	Quiet Home Indoors	---Quiet---
30	Slight Rustling of Leaves	Soft Whisper (15 feet)	---Very Quiet---
20	--	Broadcasting Studio	
10	--	Breathing	--Barely Audible--
0	--	--	--Threshold of Hearing--

Sources: American Industrial Hygiene Association (2003) and OSHA (2013).

The effects of noise are considered by how a project may increase existing noise levels and affect surrounding land uses and sensitive receptors and how a proposed land use may be affected by existing surrounding land uses. Sensitive receptors include residences; transient lodging, such as hotels and motels; hospitals; nursing homes; convalescent hospitals; schools; libraries; houses of worship; and public assembly places. When a new noise source is introduced, most people begin to notice a change in noise levels at approximately 5 dBA. Typically, average changes in noise levels of less than 5 dBA cannot be definitely considered as producing an adverse impact. For changes in average noise levels that exceed 5 dBA, most people would recognize the greater noise levels, although the impact may or may not be considered adverse.

In community noise impact analysis, long-term noise increases of 5 to 10 dBA are considered to have "some impact." Noise level increases of more than 10 dBA are generally considered severe. In the case of short-term noise increases, such as those from construction activities, the 10-dBA threshold between "some" and "severe" is replaced with a criterion of 15 dBA. These noise-averaged thresholds shall be lowered when the noise level fluctuates, when the noise has an irritating character such as considerable high frequency energy, or if the noise is accompanied by subsonic vibration. In these cases, the impact must be individually estimated.

Oyster shell mining in the South Bay is limited to the CSLC lease area (Figure 1-1), which is located in an open-water subtidal area of the bay, north of the San Mateo Bridge. No residential homes, businesses, airports, or public shoreline access sites are within 3 miles of the mining location.

3.13.2 Regulatory Setting

Federal and state laws and regulations pertaining to this issue area and relevant to the Project are identified in Appendix A. The Project includes mining of oyster shell at the CSLC lease site only. The oyster shell offloading and processing facilities in Petaluma and Collinsville are permitted by the city of Petaluma and Solano County which establish maximum allowable noise levels based on the zoning district.

3.13.3 Impact Analysis

a) Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

b) Result in exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?

c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project

d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

a) – d). Less than Significant Impact. As a result of the Project's distance from shore, no sounds from mining activities would be heard onshore. Offshore, recreational boaters, including fishermen in the South Bay, may approach the tug and barge close enough to hear mining activity. Most of the mining equipment has recently been upgraded to primarily use silent electric motors during mining, with the remaining mining equipment scheduled to be upgraded during 2018. The mining equipment would be powered by a generator, and both the generator and the tug engines would be diesel, with mufflers and sound barriers to reduce noise levels below Occupational and Health Safety Administration (OSHA) standards.

The new LTB oyster shell mining barge has greater capacity and mining efficiency when compared to the South Bay barge used during the baseline mining. As a result, the frequency and duration of mining under the Project would be less than what occurred during the baseline mining (see Section 2, Project Description) and would reduce the potential noise effects of shell mining on the public. Therefore, noise impacts would be less than significant.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? No impact.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? No impact.

e) and f). No Impact. The Project is located in an open-water subtidal area of the bay, north of the San Mateo Bridge. No public airports, public use airports, or private airstrips are within 2 miles; therefore, no impacts are anticipated for the Project.

3.13.4 Mitigation Summary

The Project would not result in significant impacts to noise in the South Bay; therefore, no mitigation is required.

3.14 POPULATION AND HOUSING

POPULATION AND HOUSING – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

3.14.1 Environmental Setting

The Project would occur in an area of open water within the South Bay with no infrastructure to serve housing or development.

3.14.2 Regulatory Setting

No federal, state, or local laws, goals, policies, or regulations relevant to this issue area are applicable to the Project due to its location and the nature of the activity.

3.14.3 Impact Analysis

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

a) – c). No Impact: No housing is within the Project area. The Project would not induce population growth or displace any housing or people.

3.14.4 Mitigation Summary

The Project would not result in significant impacts to population growth or distribution, or housing in the South Bay; therefore, no mitigation is required.

3.15 PUBLIC SERVICES

PUBLIC SERVICES	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police Protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

3.15.1 Environmental Setting

Proposed oyster shell mining would occur offshore in open-water areas of the South Bay. Schools, parks, and other public facilities are not located within the Project area or immediate vicinity offshore.

3.15.2 Regulatory Setting

Federal and state laws and regulations pertaining to this issue area and relevant to the Project are identified in Appendix A. At the local government level, no goals, policies, or regulations apply to this issue area due to the Project's location and nature of the activity.

3.15.3 Impact Analysis

a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

- Fire protection?
- Police Protection?
- Schools?
- Parks?
- Other public facilities?

a) No Impact. Lind Tug and Barge maintains an Emergency Action Plan, Fire Prevention Plan, and fire safety equipment on the oyster mining tug and barge. Upgrades to mining equipment specified in the project description result in a 58 percent reduction in mining events and a 39 percent decrease in mining hours annually, which reduces potential need for public services.

The Project will not require additional police services. Lind Tug and Barge, Inc. maintains security measures to avoid criminal activity on the oyster shell mining tug and barge.

The Project will not require additional school services. No public or private schools are in the Project area or immediate vicinity.

The Project will not require additional park services. No local, state, or national parks are in the Project area or immediate vicinity and the mining crews are on the tug and barge and do not make use of park properties.

The Project will not require an increase in electric power services. Oyster shell mining activities occur on the barge and are powered by an electrical generator.

3.15.4 Mitigation Summary

The Project would not result in significant impacts to public services in the South Bay; therefore, no mitigation is required.

3.16 RECREATION

RECREATION	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

3.16.1 Environmental Setting

San Francisco Bay is used extensively for recreational and commercial boating including fishing and local boat cruising. South Bay is a wide relatively shallow subtidal area where mining occurs in open water approximately 3 miles or more from bay shorelines.

3.16.2 Regulatory Setting

Federal and state laws and regulations pertaining to this issue area and relevant to the Project are identified in Appendix A. At the local government level, no goals, policies, or regulations are applicable to this issue area for the Project, due to its offshore location and the nature of the mining activity.

3.16.3 Impact Analysis

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

a) Less than Significant Impact. As noted above, the South Bay is a wide relatively shallow subtidal area where mining occurs in open water approximately 3 miles or more from bay shorelines Oyster shell mining by LTB has been permitted over the past several decades at the CSLC lease area located in the South Bay, north of the San Mateo Bridge. There is ample room for commercial and recreational navigation to occur simultaneously with this project during weekdays. Mining in the past has not been permitted to occur on weekends or holidays to prevent conflicts with the increased recreational use of the area on those days. LTB recently upgraded its oyster shell mining barge to a larger capacity and greater efficiency which will result in a substantial reduction in the frequency and duration (about 58 percent and 39 percent, respectively) of South Bay mining events and thereby reduce barge and tug traffic on the South Bay and further reduce the potential for

impacts to recreational and commercial boaters. Oyster shell mining by LTB is conducted in compliance with standard Operating Procedures for the Vessel Traffic Safety System of San Francisco Bay. Electronic navigational aids such as radar and crew training are used to detect and avoid boaters and aid in avoiding impacts to recreational and commercial boating.

In addition, LTB will contact the U.S. Coast Guard (USCG) San Francisco Vessel Traffic Control prior to all mining events (**APM-6**).

> **APM-6: Local Notice to Mariners.** Before and after all transit activities with the oyster shell mining tug, dredge barge and hopper barge, LTB shall contact and notify USCG, District 11 San Francisco Bay Vessel Traffic Control of all transit activities inbound and outbound to and from the lease mining area in South Bay and transiting to Mare Island or the offloading facilities.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

b) No Impact. The project is limited to offshore oyster shell mining and will have no impact on onshore recreational facilities.

3.16.4 Mitigation Summary

The Project would not result in significant impacts to recreation in the South Bay. Implementation of the following APM would further reduce the potential for Project-related impacts to recreation.

- APM-6: Local Notice to Mariners

3.17 TRANSPORTATION/TRAFFIC

TRANSPORTATION/TRAFFIC – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

3.17.1 Environmental Setting

The oyster shell mining site is located in an open-water subtidal area of the South Bay, north of the San Mateo Bridge (Figure 1-1). The Project activities are conducted by waterborne equipment. Therefore, the only traffic-related activities would be continued vehicle trips by the crew to and from the offloading location or tug and barge mooring site, as well as waterborne traffic by the tug and barge as they navigate from the offloading site to and from the South Bay CSLC lease mining site.

3.17.2 Regulatory Setting

Federal and state laws and regulations pertaining to this issue area and relevant to the Project are identified in Appendix A. At the local government level, no goals, policies, or

regulations are applicable to this issue area for the Project, due to its location and the nature of the activity.

3.17.3 Impact Analysis

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

Less than Significant Impact. Oyster shell mining by LTB in the South Bay has occurred over a number of decades. The annual volumes of oyster shell that could be mined and processed remain the same as in the past permits (up to 40,000 tons per year). The continued activity would not create new impacts to navigation on water or transportation on land. LTB recently upgraded its oyster shell mining barge to a larger capacity and greater efficiency which will result in a substantial reduction in the frequency and duration (about 58 percent and 39 percent, respectively) of South Bay mining events and thereby reduce barge and tug traffic on the South Bay. The oyster shell is transported with the same combination of equipment used during mining. Each 2017 mining episode resulted in the production of about 1,400 tons of oyster shell; and this amount of product would require about 70 truckloads to cover the 60 road miles between the San Mateo Bridge and Petaluma. This truck route is urban and heavily congested with traffic. Transportation by barge reduces both air emissions and traffic congestion when compared to transportation to the processing facility by truck.

LTB crew training and mining methods comply with the standard Operating Procedures for Vessel Traffic Safety System of San Francisco Bay to avoid any hazard to commercial, recreational, or military navigation. The Applicant will submit to the U.S. Coast Guard (USCG) for publication a Local Notice to Mariners 14 days before mining events as required under **APM-6** to ensure impacts remain less than significant.

b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment*)?*

e) Result in inadequate emergency access?

f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

b) – f). No Impact. The project is located in an open-water subtidal area of the South Bay, north of the San Mateo Bridge. The project activities are conducted by waterborne equipment. Therefore, the only traffic-related activities would be continued vehicle trips by the crew to and from the offloading location or tug and barge mooring site, as well as waterborne traffic by the tug and barge as they navigate from the offloading site to and from the South Bay CSLC mining site. There will no impacts to onshore transportation.

3.17.4 Mitigation Summary

The Project would not result in significant impacts to transportation or traffic in the South Bay. Implementation of the following APM would further reduce the potential for Project-related impacts to Transportation/Traffic.

- APM-6: Local Notice to Mariners

3.18 UTILITIES AND SERVICE SYSTEMS

UTILITIES AND SERVICE SYSTEMS – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the Project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

3.18.1 Environmental Setting

The Project site is in an open-water subtidal area of the South Bay. The mining methods, annual volume of shell mined, CSLC mining lease area, transport, offloading, and processing for the Project (see Section 2, *Project Description*) are comparable or less than those that occurred under the environmental baseline.

3.18.2 Regulatory Setting

No specific federal, state, or local laws, regulations, goals, or policies are applicable to this issue area for the Project, due to its offshore location and the nature of the marine activity.

3.18.3 Impact Analysis

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

d) Have sufficient water supplies available to serve the Project from existing entitlements and resources, or are new or expanded entitlements needed?

e) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?

f) Be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs?

g) Comply with federal, state, and local statutes and regulations related to solid waste?

a) – g). No Impact. Oyster shell mining has been conducted by LTB in the South Bay over a number of decades. Oyster shell is washed on the barge immediately after collection using ambient bay water which is then discharged into the bay using an underwater distribution pipeline system. No new construction or expansion of wastewater treatment or stormwater drainage facilities would be required. LTB disposes of solid waste using existing dumpsters and waste receptacles which are disposed of by conventional existing garbage collection and disposal facilities. No impacts have been identified to utilities and service systems.

3.18.4 Mitigation Summary

The Project would not result in impacts to utilities and service systems in the South Bay; therefore, no mitigation is required.

3.19 MANDATORY FINDINGS OF SIGNIFICANCE

3.19.1 Introduction

The lead agency shall find that a project may have a significant effect on the environment and thereby require an EIR to be prepared for the project where there is substantial evidence, in light of the whole record, that any of the following conditions may occur. Where prior to commencement of the environmental analysis a project proponent agrees to MMs or project modifications that would avoid any significant effect on the environment or would mitigate the significant environmental effect, a lead agency need not prepare an EIR solely because without mitigation the environmental effects would have been significant (per State CEQA Guidelines, § 15065).

MANDATORY FINDINGS OF SIGNIFICANCE –	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of past, present and probable future projects)?	☐	☐	☒	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

3.19.2 Impact Analysis

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

Less than Significant with Mitigation. As described in Section 3.4, *Biological Resources*, the Project would not significantly adversely affect fish or wildlife habitat, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of an endangered, rare or threatened species. With implementation of **MM BIO-1 through MM BIO-6**, **APM-3**, and **APM-4**, the short-term and localized impacts to special-status species and their habitats would be less than significant. The Project's potential effects on historic and archaeological resources and Tribal cultural resources are described in Section 3.5, *Cultural and Paleontological Resources*, and Section 3.6, *Cultural Resources – Tribal*; no resources are known to be present in the Project area. Implementation of **MM CUL-1** and **MM CUL-2** would reduce the potential for Project-related impacts to cultural and paleontological resources to less than significant.

b) Does the project have impacts that would be individually limited, but cumulatively considerable?

Less than Significant Impact. As provided in this MND, although the Applicant has identified and will implement several Applicant Proposed Measures, the Project has the potential to significantly impact the following environmental disciplines: Biological Resources, Cultural and Paleontological Resources, and Tribal Cultural Resources. However, measures have been identified that would reduce these impacts to a level of less than significant. Onshore offloading of mined oyster shell would continue to occur at existing permitted industrial facilities in Petaluma or Collinsville. For any impact to act cumulatively on any past, present, or reasonably foreseeable projects, these projects would have to have individual impacts in the same resource areas, some at the same time, or occur within an overlapping area as the proposed Project. No such project(s) were identified that would result in cumulative impacts; therefore, this impact would be less than significant.

c) Does the project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?

Less than Significant Impact. The Project's potential to impact human beings is addressed throughout this document, including in sections that affect resources used or enjoyed by the public, residents and others in the Project area (e.g., Aesthetics, Public Services, Recreation), sections analyzing public safety and well-being (e.g., Air Quality, Geology and Soils, GHG Emissions, and Noise), and sections that address community character and essential infrastructure (e.g., Land Use and Planning, Population and Housing, Transportation, Utilities). None of these analyses identify a potential adverse effect on human beings that could not be avoided or minimized by the implementation of mitigation measures described or compliance with regulatory requirements. With mitigation in place, Project impacts on human beings would be less than significant.

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4.0 MITIGATION MONITORING PROGRAM

The California State Lands Commission (Commission or CSLC) is the lead agency under the California Environmental Quality Act (CEQA) for the Lind Tug and Barge, Inc. Oyster Shell Mining Project (Project). In conjunction with approval of this Project, the CSLC adopts this Mitigation Monitoring Program (MMP) for implementation of mitigation measures (MMs) for the Project to comply with Public Resources Code section 21081.6, subdivision (a) and State CEQA Guidelines sections 15091, subdivision (d), and 15097.

The Project authorizes Lind Tug and Barge, Inc. (LTB or Applicant) to continue to operate and mine relic oyster shell deposits in the South Bay. Use of the State sovereign land for the mining of these oyster shell deposits is currently authorized under the existing CSLC Lease PRC 5534.1, hereinafter referred to as the "State Lease."

4.1 PURPOSE

The purpose of an MMP is to ensure compliance and implementation of MMs so that all identified significant impacts from the Project are mitigated to the maximum extent feasible. This MMP shall be used as a working guide for implementation, monitoring, and reporting for the Project's MMs.

4.2 ENFORCEMENT AND COMPLIANCE

The CSLC is responsible for enforcing this MMP. The Project Applicant (LTB) is responsible for the successful implementation of and compliance with the MMs identified in this MMP. This includes all field personnel and contractors working for the Applicant.

4.3 MONITORING

The CSLC staff may delegate duties and responsibilities for monitoring to other environmental monitors or consultants as necessary. Some monitoring responsibilities may be assumed by other agencies, such as affected jurisdictions, Bay Area Air Quality Management District, San Mateo County, the city of San Mateo, or the San Francisco Bay Conservation and Development Commission (BCDC). The CSLC or its designee shall ensure that qualified environmental monitors are assigned to the Project.

4.3.1 Environmental Monitors

To ensure implementation and success of the MMs, an environmental monitor must be on site during all Project activities that have the potential to create significant environmental impacts or impacts for which mitigation is required. Along with the CSLC staff, the environmental monitor(s) are responsible for:

- Ensuring that the Applicant has obtained all applicable agency reviews and approvals

- Coordinating with the Applicant to integrate the mitigation monitoring procedures during Project implementation (for this Project, many of the monitoring procedures shall be conducted during the deconstruction phase)
- Ensuring that the MMP is followed

The environmental monitor shall immediately report any deviation from the procedures identified in this MMP to the CSLC staff or its designee. The CSLC staff or its designee shall approve any deviation and its correction.

Workforce Personnel. Implementation of the MMP requires the full cooperation of Project personnel and supervisors. Many of the MMs require action from site supervisors and their crews. The following actions shall be taken to ensure successful implementation:

- Relevant mitigation procedures shall be written into contracts between the Applicant and any contractors

General Reporting Procedures. A monitoring record form shall be submitted to the Applicant, and once the Project is complete, a compilation of all the logs shall be submitted to the CSLC staff. The CSLC staff or its designated environmental monitor shall develop a checklist to track all procedures required for each MM and shall ensure that the timing specified for the procedures is followed. The environmental monitor shall note any issues that may occur and take appropriate action to resolve them.

Public Access to Records. Records and reports are open to the public and would be provided upon request.

4.4 MITIGATION MONITORING TABLE

This section presents the mitigation monitoring table for the following environmental disciplines: Biological Resources, Cultural and Paleontological Resources, Cultural Resources – Tribal, and Hazards and Hazardous Materials. All other environmental disciplines were found to have less than significant or no impacts and are therefore not included below. The table lists the following information, by column:

- Impact (impact number, title, and impact class)
- Mitigation and Applicant-proposed measure (full text of the measure)
- Location (where impact occurs and mitigation measure should be applied)
- Monitoring/reporting action (action to be taken by monitor or Lead Agency)
- Timing (before, during, or after construction; during operation, etc.)
- Responsible party
- Effectiveness criteria (how the agency can know if the measure is effective)

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
BIOLOGICAL RESOURCES						
Potential Impacts to Special-Status Species and Habitat	**MM BIO-1: Turbidity Reduction During Mining**. The oyster mining barge shall incorporate a subsurface discharge to increase dispersal (located approximately 4.5 feet below the surface) of the "overflow plume."	Lease area (PRC 5534)	Initial verification and annual onsite-turbidity reduction equipment configuration verification by CSLC.	Verification by CSLC that subsurface discharge installed.	Applicant and CSLC	Verification within first 2 months after lease approval
	MM BIO-2: Limited Volume per Year. The Applicant shall not mine oyster shells over the permitted volume of 80,000 cubic yards per year.	Lease area (PRC 5534)	Onsite and remote monitor to verify	Logs, documentation, inspections, and summaries.	Applicant and CSLC	Annual volume reporting
	MM BIO-3: Installation of Positive Barrier Fish Screens. The Applicant shall not conduct any oyster shell extraction within the lease area without the installation of Positive Barrier Fish Screens as approved by the California Department of Fish and Wildlife, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The screens shall be installed on the drag head arm and the wash water intake.	Lease area (PRC 5534)	Onsite monitor to verify	Installation and full-time operation of Positive Barrier Screens	Applicant and CSLC	Verification within first 2 months after lease approval
	MM BIO-4: Limited Water Pumping Depths. When clearing the suction pipe, the Applicant shall ensure that the end of the drag head arm pipe is within 3 feet of the Bay bottom.	Lease area (PRC 5534)	Onsite monitor to verify	Logs, documentation, inspections, and summaries.	Applicant and CSLC	Verification within first 2 months after lease approval
	MM BIO-5: Mitigation Effectiveness Monitoring. The Applicant shall conduct compliance monitoring for the oyster shell mining operations to include and report the following: • Operational logs documenting date, mining event log number, volume, lease site. • Documentation on the beginning and end location coordinates for each mining event to be provided	Lease area (PRC 5534)	Onsite monitor to verify	Logs, documentation, inspections, and summaries.	Applicant and CSLC	Verification within first 3 months after lease approval and quarterly reporting

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	to the California Department of Fish and Wildlife, U.S. Army Corps of Engineers, and San Francisco Bay Conservation and Development Commission so that each agency can review reporting forms. • Documentation on the duration (minutes) of pump priming and clearing for each mining event when the suction head is not in contact with the bottom substrate and pump engaged. • Visual inspection of the fish screens following each mining event to verify screen integrity, remove any impinged debris, and record any fish or macroinvertebrates impinged on the screen. • Preparation of an annual summary of mining activity and quantification of the area of suitable shallow water required to fully mitigate incidental take based on the approach and assumptions (volumetric basis for full mitigation calculations) and an accounting of the mitigation habitat area (acres) that have been purchased by the Applicant for fishery mitigation in compliance with Section 8 of the Incidental Take Permit.					
	MM BIO-6: Limited Mining Area. Oyster shell mining shall be restricted to the specific lease area designated by the California State Lands Commission in the South Bay and is not permitted outside of the lease area (PRC 5534). Oyster shell mining activities shall be monitored for location and duration activity within the lease area with a global positioning system (GPS) tracking and reporting system.	Lease area (PRC 5534)	Onsite monitor to verify	Logs, documentation, inspections, and summaries.	Applicant and CSLC	Verification of GPS system installation within 6 months of lease approval. Quarterly GPS data reporting

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
CULTURAL AND PALEONTOLOGICAL RESOURCES						
Potential Discovery of Unidentified Cultural Resources, Paleontological or Human Remains	**MM CUL-1: Mining Personnel Cultural Resource Sensitivity Training.** The Applicant shall retain a certified archaeologist, defined as an archaeologist meeting the Secretary of the Interior's Standards for professional archaeology (U.S. Department of the Interior, 2011), to carry out this measure related to archaeological, tribal, historical, and paleontological resources. • After lease approval and prior to the first mining episode, the archaeologist, in coordination with the CSLC and a California Native American tribe(s) that is culturally-affiliated to the Project site, shall prepare a Cultural Resources Sensitivity Training Guide for all personnel working on the barge. A copy of the Cultural Resources Sensitivity Training Guide shall be submitted to the California State Lands Commission (CSLC) for approval. The Training Guide shall include an overview of potential cultural resources that could be encountered during mining activities to facilitate worker recognition, avoidance, and subsequent immediate notification to the archaeologist and culturally-affiliated Native American tribe(s) for further evaluation and action, as appropriate. • Lind Tug and Barge (LTB) shall ensure all new personnel obtain Cultural Resources Sensitivity Training prior to mining activities. • The Cultural Resources Sensitivity Training Guide shall be kept available on the barge for all personnel to review and be familiar with as necessary. • In the event that cultural resources are discovered during mining activities, all mining	Lease area (PRC 5534)	Onsite monitor to verify	Implementing MM will reduce the potential for impacts to any Culturally Significant Resource or discovering human remains	Applicant and CSLC	Annual records to verify staff training completion

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	shall be suspended until a certified archaeologist has evaluated the nature and significance of the discovery. LTB shall notify CSLC staff of all potential archaeological, paleontological, historic or cultural resources that may be discovered and evaluated by the archeologist. A treatment plan on handling potentially significant resources shall be developed by the archaeologist and submitted to CSLC staff for review and approval. Title to all abandoned shipwrecks, archaeological, paleontological, historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC. • In the event that a discovery relates to a tribal cultural resource, the certified archaeologist shall immediately coordinate with the CSLC and culturally-affiliated Native American tribe(s) to evaluate the nature and extent of the discovery as well as its potential significance. The location of any such discoveries must be kept confidential and measures should be taken to ensure that the area is secured to minimize site disturbance and potential vandalism. Impacts to previously unknown significant Tribal cultural resources shall be avoided through preservation in place if feasible.					
	MM CUL-2: Unanticipated Discovery of Human Remains. If human remains are encountered, all provisions provided in California Health and Safety Code section 7050.5 and California Public Resources Code section 5097.98 shall be followed.	Lease area (PRC 5534)	Onsite monitor to verify	Compliance with state laws for discovering human remains	Applicant and CSLC	Annual records to verify staff training completion

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
CULTURAL RESOURCES – TRIBAL						
Potential Discovery of Unidentified Tribal Cultural Resources	Implement **MM CUL-1: Mining Personnel Cultural Resource Sensitivity Training** and **MM CUL-2: Unanticipated Discovery of Human Remains** (see above)					
HAZARDS AND HAZARDOUS MATERIALS						
Potential Release of Hazardous Materials into the Environment	**MM HAZ-1: Hazardous Material Control and Spill Prevention and Response Plan.** The Spill Response Field Guide Emergency Procedures Response Action Checklist shall be implemented to ensure any accidental discharge is contained by the crew at the site. The dredge and tug crews shall be trained in accidental spill prevention, containment and response (including Agency notification) in the unlikely event of an accidental spill and discharge to the South Bay during a mining event. The dredge and tug boat crews will have access to cleanup equipment at all times.	Lease Area (PRC 5534) and transit to and from Port Facilities	Onsite monitor to verify	Prevention or containment of all accidental discharges.	Applicant and CSLC	Verification within first 6 months after lease approval
APPLICANT PROPOSED MEASURES						
APM-1: Replacement of Tier-0 and Tier-1 Pump Engines with Electric Motors. The Applicant will electrify the oyster mining and wash water pumps to eliminate the use of older less efficient diesel engines to drive the various pumps used for oyster shell mining. The change from diesel powered pumps to electrical motor driven pumps will greatly reduce impacts to air quality.		N/A	Verification of the engine change out by CSLC	Reduction in air emissions	Applicant and CSLC	Verification within first 6 months after lease approval
APM-2: Electrification of the Mining Pumps with a Tier-4 Diesel Generator. The Applicant will use one, state-of-the-art Tier-4 diesel generator to power all barge mining equipment to further contribute to a substantial reduction in air emissions when compared to the environmental baseline. The change to the Tier 4 diesel generator has been proposed and implemented by the Applicant.		N/A	Verification of the engine change out by CSLC	Reduction in air emissions	Applicant and CSLC	Verification within first 6 months after lease approval
APM-3: Periodic Bathymetric Surveys. The Applicant will conduct bathymetric surveys to assess current and future bathymetric conditions within the lease area. The Applicant proposes to conduct		Lease area	Approval of the Benthic Studies	Submittal of bathymetric surveys	Applicant and CSLC	Verification within first 6 months after

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	further periodic bathymetric surveys beginning in 2018, then 2022 and 2026 to evaluate potential trends and impacts with regard to South Bay bathymetry. The Applicant will collaborate with regulatory agencies to develop the survey parameters.	(PRC 5534)				lease approval
	APM-4: Seasonal Curtailment of Mining. A 2-month seasonal curtailment of mining (no mining activities) will occur between February and June of the calendar year. Prior to January 31 of each year, the Applicant shall request California Department of Fish and Wildlife to determine the appropriate 2-month window to ensure the curtailment is consistent with seasonal avoidance windows in other regions of the San Francisco Bay to avoid take of state listed species.	N/A	N/A	Avoid significant biological resources and habitat impacts	Applicant and CSLC	Verification in January of each year for CDFW to determine the 2-month window
	APM-5: Water Quality Wash Water Plume Study within First 2 Years of New Permits. The Applicant will collaborate with the San Francisco Bay Regional Water Quality Control Board and other interested agencies to design, fund, conduct, and report results of a discharge plume water quality monitoring study as part of the Project within 2 years after execution of a new lease.	Lease area (PRC 5534)	Approval of the Water Quality Wash Water Plume Study	Discharge plume water quality monitoring study	Applicant, SFBRWQCB and CSLC	Verification within first 2 years with SFBRWQCB staff
	APM-6: Local Notice to Mariners. Before and after all transit activities with the oyster shell mining tug, dredge barge and hopper barge, LTB shall contact and notify USCG, District 11 San Francisco Bay Vessel Traffic Control of all transit activities inbound and outbound to and from the lease mining area in South Bay and transiting to Mare Island or the offloading facilities.	Lease area (PRC 5534) and Transit to and from Port Facilities	CSLC to confirm notification to USCG.	Effective coordination and response	Applicant and CSLC	Verification within first 6 months after lease approval and annually through the lease term

5.0 OTHER COMMISSION CONSIDERATIONS

In addition to the environmental review required pursuant to the California Environmental Quality Act (CEQA), a public agency may consider other information and policies in its decision-making process. This section presents information relevant to the California State Lands Commission's (Commission or CSLC) consideration of the LTB, Inc. Oyster Shell Mining Project (Project). The considerations included below address:

- Climate Change and Sea-Level Rise
- Commercial Fishing
- Environmental Justice
- State Tide and Submerged Lands Possessing Significant Environmental Values

Other considerations may be addressed in the staff report presented at the time of the CSLC's consideration of the Project.

5.1 CLIMATE CHANGE AND SEA-LEVEL RISE

Given the Project's short duration and because no permanent infrastructure is proposed, sea-level rise as a function of the global climate change process is not expected to have any effect on the Project. However, because climate change and sea-level rise accelerate and exacerbate natural coastal processes, such as intensity and frequency of storms, erosion and sediment transport, currents, wave action, and ocean chemistry, a brief discussion of climate change and sea-level rise is provided here.

Sea-level rise is driven by the melting of polar ice caps and land ice, as well as thermal expansion of sea water. Accelerating rates of sea-level rise are attributed to increasing global temperatures due to climate change. Estimates of projected sea-level rise vary regionally and are a function of different greenhouse gas emissions scenarios, rates of ice melt, and local vertical land movement. Compared to year 2000 levels, the central California region could see up to 1 foot of sea-level rise by the year 2030, 2 feet by 2050, and possibly over 5 feet by 2100 (National Research Council 2012). The range in potential sea-level rise indicates the complexity and uncertainty of projecting these future changes, particularly in the second half of the century, which depend on the rate and extent of ice melt. California is coordinating research efforts to understand more about the individual influences of certain contributing factors, such as ice melt, and will issue findings and new planning guidance related to sea-level rise by 2018 (National Research Council 2012).

Along with higher sea levels, higher intensity and more frequent winter storms due to climate change will further impact coastal areas. The combination of these conditions will likely result in increased wave run up, storm surge, and flooding in coastal and near coastal areas. In rivers and tidally-influenced waterways, more frequent and powerful storms can result in increased flooding conditions and damage from storm created debris. Climate change and sea-level rise will also affect coastal and riverine areas by changing

erosion and sedimentation rates. Beaches, coastal landscapes, and near-coastal riverine areas exposed to increased wave force, run up, and total water levels could potentially erode more quickly than before. However, rivers and creeks are also predicted to experience flashier sedimentation pulse events from strong winter storms, punctuated by periods of drought. Therefore, depending on precipitation patterns, sediment deposition and accretion may accelerate along some shorelines and coasts.

Pursuant to Executive Order B-30-15 (see Appendix A), all state agencies must take climate change into account in their planning and investment decisions and to give priority to actions that build climate preparedness. The preceding discussion of climate change and sea-level rise is intended to provide the local/regional overview and context that the CSLC staff considered pursuant to this Executive Order.

5.2 COMMERCIAL FISHING

Impacts to commercial fisheries are not considered significant due to the lack of suitable fish habitat (e.g., hard-bottom habitat) within the Project site and the short-term duration of Project mining events. The lease area site is shallow tidal flat, and the nearest kelp beds are outside the Golden Gate near Half Moon Bay or the southern boundary of Point Reyes (Sanctuary Integrated Monitoring Network [SIMoN] Database 2007). The lack of resources substantially limits the number of offshore fishermen that currently use the Project area. In addition, oyster shell mining activities will be conducted in depths between 15 and 20 feet. Due to these habitat limits, the only commercial fishing that might occur would be near Alviso, which also supports a small commercial bait fishery for bay shrimp.

5.3 ENVIRONMENTAL JUSTICE

Environmental justice is defined by California law as “the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.” This definition is consistent with the Public Trust Doctrine principle that the management of trust lands is for the benefit of all people. The CSLC adopted an environmental justice policy in October 2002 to ensure that environmental justice is an essential consideration in the agency’s processes, decisions, and programs.[8] Through its policy, CSLC reaffirms its commitment to an informed and open process in which all people are treated equitably and with dignity, and in which its decisions are tempered by environmental justice considerations.

In keeping with its commitment to environmental sustainability and access to all, California was one of the first states to codify the concept of environmental justice in statute. Beyond the fair treatment principles described in statute, environmental justice leaders work to include in the decision-making process those individuals

[8] The CSLC anticipates it will update its environmental justice policy in 2018 (see www.slc.ca.gov/Info/EnviroJustice.html).

disproportionately impacted by project effects. The goal is that through equal access to the decision-making process, everyone has equal protection from environmental and health hazards and can live, learn, play, and work in a healthy environment.

In 2016, legislation was enacted to require local governments with disadvantaged communities, as defined in statute, to incorporate environmental justice into their general plans when two or more general plan elements (sections) are updated. The Governor's Office of Planning and Research, the lead state agency on planning issues, is working with state agencies, local governments, and many partners to update the General Plan Guidelines in 2018 with guidance for communities on environmental justice (Stats 2016).

The U.S. Council of Environmental Quality's (CEQ 1997) Environmental Justice Guidance defines "minorities" as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander, Black not of Hispanic origin, or Hispanic (CEQ 1997). Total minority population is calculated by subtracting the white alone, not Hispanic or Latino population, from the total population. According to the CEQ Environmental Justice Guidelines, minority populations should be identified if:

- A minority population percentage exceeds 50 percent of the population of the affected area
- The minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (for example, a governing body's jurisdiction, neighborhood census tract, or other similar unit)

In addition, the CEQ Environmental Justice Guidance defines "low-income populations" as populations with mean annual incomes below the annual statistical poverty level (CEQ 1997). The CEQ does not provide a discrete threshold for determining when a low-income population should be identified for environmental justice; however, for this analysis, an environmental justice population is identified if the low-income percentage of a local study area is equal to or greater than those of its respective county (San Mateo, Alameda, Sonoma, or Solano).

Table 5-1 presents income, employment, and race data of the regional and local study areas in the Project vicinity, based on the most recently available information from U.S. Census 2012-2016 American Community Survey (ACS) data.[9]

[9] U.S. Census 2012-2016 ACS estimates come from a sample population, but are more current statistics than the most recent full census of 2010. Because they are based on a sample of population, a certain level of variability is associated with the estimates. Supporting documentation on ACS data accuracy and statistical testing can be found on the ACS website in the Data and Documentation section available here: www.census.gov/acs/www/data_documentation/documentation_main/.

Table 5-1. Environmental Justice Statistics

Subject		California	Alameda County	Foster City	San Mateo County	City of San Mateo	Sonoma County	City of Petaluma	Solano County
Income and Population									
Total Population		38,654,206	1,605,217	32,967	754,748	102,224	497,776	59,757	429,596
Median household income		$63,783	$79,831	$129,733	$98,546	$95,667	$66,833	$80,907	$69,227
Percent below the Poverty level		15.8	12.0	4.3	7.7	7.9	11.2	8.6	12.7
Employment by Industry (percentage)									
Agriculture, forestry, fishing and hunting, and mining		2.4	0.4	0.2	0.5	0.3	3.2	2.0	1.6
Construction		6.0	5.3	1.8	5.2	5.3	7.7	7.8	7.5
Manufacturing		9.7	10.1	11.6	7.8	8.1	10.0	6.7	8.9
Wholesale trade		3.0	2.7	2.2	2.3	1.7	2.9	2.9	2.7
Retail trade		11.0	9.4	7.6	9.9	8.9	11.8	12.0	11.8
Transportation and warehousing, and utilities		4.8	5.0	3.7	5.5	5.6	3.3	3.2	5.8
Information		2.9	3.3	5.7	4.0	4.7	1.9	3.1	1.9
Finance and insurance, and real estate and rental and leasing		6.2	6.1	10.2	7.4	7.5	6.2	7.0	5.6
Professional, scientific, and management, and administrative and waste management services		13.1	18.0	30.7	17.9	19.2	11.6	12.9	9.9
Educational services, and health care and social assistance		20.9	22.1	17.0	20.7	18.4	21.0	21.7	22.5
Arts, entertainment, and recreation, and accommodation and food services		10.3	9.0	4.4	10.0	11.5	11.0	10.9	9.9
Other services, except public administration		5.3	5.2	3.0	5.3	5.9	5.5	5.3	4.6
Public administration		4.4	3.5	1.9	3.5	2.8	4.0	4.4	7.4
Race									
Not Hispanic or Latino	White	38.4	32.6	41.6	40.4	44.2	64.4	69.3	39.4
	Black	5.6	11.0	1.8	2.3	2.0	1.3	0.7	13.6
	American Indian	0.4	0.3	0.2	0.1	0.2	0.5	0.1	0.2
	Asian	13.7	28.0	46.8	26.6	20.8	3.9	4.5	14.8
	Other/mix	3.3	5.5	5.1	5.5	6.0	3.9	4.0	6.6
Hispanic or Latino		38.6	22.6	4.5	25.1	26.8	26.0	21.4	25.4

Source: U.S. Census Bureau 2018 (https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml#)

From a regional standpoint, the Project study areas contain average to above-average income levels compared to their respective counties and the State.[10] The cities of San Mateo, Foster City, and Petaluma are supported primarily by professional, scientific, and management, and administrative and waste management services; educational services, and health care and social assistance; manufacturing; and finance and insurance, and real estate and rental and leasing services (U.S. Census Bureau 2017).

By race, persons who identified as white are one of the largest racial groups in the regional and local study areas reviewed within the Project surroundings (see Table 5-1). Hispanic/Latino minority groups comprise the largest minority population overall, followed closely by Asian minorities (the Census Bureau classifies Hispanic as an origin, not a race). Those who identify as Hispanic can be categorized under any of the U.S. Census Bureau classification groups, including "other," in addition to Hispanic. None of the regional or local study areas contained greater than 50 percent of any minority population, however Foster City is listed with 46.8 percent of the population characterized as Asian, compared to 28 percent for Alameda County. Foster City thus contains an identified minority population.

For poverty, none of the local study areas contains a greater percentage of low-income population than that within the respective County as a whole (see Table 5-1). The percentage of the population living below the poverty level within each city is similar or lower, and none of the local study areas is considered to contain a low-income population of concern with respect to environmental justice.

Since the percentage of these minority and low-income populations in the nearest communities is not disproportionately higher than in the surrounding area, except for Foster City's identified minority population, impacts from Project activities would not have a disproportionate impact. In addition, the distance from the Project site to residential communities, and small scale and short-term Project duration, ensure that environmental justice impacts to Foster City's minority communities and all nearby residential communities would be minor, regardless of socioeconomic determination.

5.4 STATE TIDE AND SUBMERGED LANDS POSSESSING SIGNIFICANT ENVIRONMENTAL VALUES

The Project involves lands identified as possessing significant environmental values within the CSLC's Significant Lands Inventory, pursuant to Public Resources Code section 6370 et seq. The Project area is in the Significant Lands Inventory as parcel number 41-063-000, which includes the tide lands of the South San Francisco Bay lying below the ordinary high-water mark from Foster City in the south extending to the San

[10] Collinsville, an unincorporated community located in Solano County and one location for oyster shell offloading, has no specific income, employment and race data available. Table 5-1 includes Solano County for reference.

Francisco City and County line to the north by Brisbane. The subject lands are classified in use category Class C, which authorizes multiple use. Environmental values identified for these lands are mostly biological, including endangered species, fishery and wildlife support, and marine life, but also having recreational values.

Based upon CSLC staff's review of the Significant Lands Inventory, consultation with California Department of Fish and Wildlife, and through the CEQA analysis provided in this MND, the project, as proposed, will not significantly affect those lands and is consistent with the use classification.

6.0 MND PREPARATION SOURCES AND REFERENCES

This Mitigated Negative Declaration (MND) was prepared by California State Lands Commission Division of Environmental Planning and Management (DEPM) staff, with the assistance of the professional consulting firm of Hanson Environmental.

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